American Gas Association MONTHLY

Gas Men Atlantic City Bound

•

Cooking—and the Gas Bill

•

Gas Heating Consumption Data

•

Plastics in Defense Picture

•

What's Ahead in Measurement?

October 1941

VOLUME XXIII NUMBER 9

"Information

Please!!" ON

WINTER AIR CONDITIONING SYSTEMS

Question: I want to increase my house heating sales. What can you suggest?

Answer: One of the biggest helps to house heating sales is customer satisfaction. Nothing leads so surely to satisfaction as a well-heated house, free from drafts, noise, and high fuel bills.

Question: I realize all that, but how can I get good gas heating systems into my customers' houses?

Answer: By the use of the GASCO INSTALLATION GUIDE, which gives you recommended practices for winter air conditioning systems. Follow the GASCO GUIDE and watch satisfaction increase and service calls decline.

Question: How do I use the GASCO GUIDE?

Answer: Get copies into the hands of every architect, builder and heating installer in your territory. Then follow them up to see that the GASCO GUIDE is being used.

Question: Who developed the GASCO GUIDE, and where do I get it?

Answer: It was prepared by the Metropolitan Gas Heating and Air Conditioning Council, in cooperation with the Metropolitan Service Managers Council. **Copies are available from the American Gas Association at 7½ cents each to company or individual members of the A. G. A., and 15 cents each to those not A. G. A. members.**

Question: Thanks a lot. The GASCO GUIDE appears to be just what I need. I'm going to order enough for my salesmen and for everybody in my territory who is connected with the design or installation of winter air conditioning systems.

Why not follow the above and order your supply today?

AMERICAN GAS ASSOCIATION · 420 Lexington Avenue, New York, N. Y.

American Gas Association MONTHLY

CONTENTS FOR OCTOBER 1941

There will be much pulse-taking of the gas industry's effort in aiding national defense when the Annual Meeting of the Association convenes this month. Those defense clinics which seem to abound in this year's program are packed with the industry's big wigs who should be able to solve all gas industry bottlenecks—if any. . . . At last somebody's done something about it! We mean the question of getting actual gas house heating demand and consumption data which has been long-discussed but little acted upon. Messrs. Pilkington and Garnhart have rendered a distinctive service to the industry in preparing the thorough and valuable report of their company's study of 90 single-family houses. They've set the pace, now how many companies will follow suit? . . . Miss Forschner gives significant data on average cooking consumption in an 1800-unit housing development which answers some pertinent questions. . . . If you read the first paragraph of "Gas, Plastics and National Defense," you won't stop until you've finished that fascinating story of the rise of a new industry and its vital place in the defense economy. Dr. Wakeman adds new facts to his authoritative exposition of plastics which he presented at the last A. G. A. convention.

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THE METER WASHER—Photograph of an old Negro who has been boss of "The Potash Tank" in the Newark Meter Shop for many years. Taken by H. W. Nicolson, assistant engineer of distribution, gas department, Public Service Electric and Gas Company, this picture is the October winner in the contest for A. G. A. MONTHLY frontispiece illustrations.

American Gas Association MONTHLY

JAMES M. BEALL, *Editor*

READY TO GO
.... Defense To Dominate Atlantic City Meeting

A STREAMLINED program with a strong accent on defense is in store for the delegates who attend the American Gas Association's twenty-third Annual Meeting in Atlantic City, N. J., October 20-22. With approximately 20 per cent of the nation's industrial machinery devoted to defense work and more being added by the day, it is natural that this year's program should revolve around the gas industry's part in the present emergency. National emphasis on production and economic efficiency led the Association's Executive Board to limit this year's annual event in length and number of meetings with discussion confined to problems of the utmost importance to the gas industry.

•

General sessions at the two and one-half day meeting will be held Tuesday and Wednesday mornings in the Ballroom of the Atlantic City Auditorium. In addition there will be a general subscription dinner Tuesday evening and a general subscription luncheon on Wednesday which will end the Annual Meeting. Both of these as well as the Home Service Breakfast on Tuesday morning will be held in the American Room of the Hotel Traymore.

Sectional meetings have been arranged as follows: Natural Gas Section—Monday afternoon (American Room, Hotel Traymore); Accounting Section—Monday morning and Tuesday noon (The Ritz-Carlton); Industrial and Commercial Gas Section—Monday morning and Tuesday afternoon (Rose Room, Hotel Traymore); Residential Section—Monday morning and Tuesday afternoon (American Room, Hotel Traymore); and Technical Section—Monday morning and Tuesday afternoon (Haddon Hall).

President T. J. Strickler, of Kansas City, will undoubtedly set the keynote of the meeting at the first general session, Tuesday morning, when he speaks on the place of the Association and the gas industry in the economic structure of the country. The theme of his address will be the importance of a united gas industry in the light of these uncertain times, together with a strong plea for faith in the future.

Underlining President Strickler's theme and supplementing it, will be an inspirational address following the Tuesday evening dinner by Dr. Norman V. Peale, pastor, Marble Collegiate Church, New York, on "The Faith of America." An eloquent speaker who for six years has conducted a radio program known as "The Art of Living" from Station WEAF, New York, over a national hook-up, Dr. Peale will have a message of vital significance to all Americans. He has an outstanding background in his field and is the author of two books, "The Art of Living" and "You Can Win" and co-author with Dr. Smiley Blanton of the book "Faith Is the Answer; A Psychiatrist and a Pastor Discuss Your Problems."

Of great current interest will be the address on "Mobilizing for National Defense" by Hugh H. Clegg, assistant director in charge of the Training and Inspection Division of the Federal Bureau of Investigation. Mr. Clegg, who has been associated with the F.B.I. since 1926, will give authoritative advice on the gas industry's part in the defense program. He will discuss plant protection, sabotage and other emergency problems.

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H. Carl Wolf, president, Atlanta Gas Light Company, and chairman, Industrial and Commercial Gas Section, will present a forthright discussion of "Promotional Policies in the National Emergency." In view of the great need for a uniform national policy in sales of gas during and after the emergency, Mr. Wolf's address will set a guidepost for company sales management. He is widely recognized as a leader of progressive sales promotional policies.

An important part of one general session has been set aside for an analysis of emergency and post-emergency research programs. This phase of the industry's activities will be opened by F. Marion Banks, vice-president, Southern

President
T. J. Strickler

Vice-President
George S. Hawley

Treasurer
Ernest R. Acker

Dr. Norman V. Peale

Hugh H. Clegg,
F. B. I.

J. Ernestine Becker

California Gas Company, Los Angeles, who will outline the broad general objectives of the industry before and after the war period. He will be followed by Dr. H. T. Heald, president of Illinois Institute of Technology and the Institute of Gas Technology, who will present in detail the Gas Institute program which involves long-range research supported by a large section of the manufactured and natural gas industries. This program was launched a few months ago after several years of investigation.

"Survival Value" is the subject assigned to F. Alexander Magoun, professor of human relations, at Massachusetts Institute of Technology, who will be a major speaker at the first general session. A noted lecturer on human relations in industry and author of seven books, Prof. Magoun will tell what team work and good leadership can contribute to the gas industry.

An outstanding gas industry executive whose name will be announced later will address the general subscription luncheon Wednesday afternoon which will wind up the general sessions program.

The annual presentation of awards by President Strickler will take place at the Tuesday evening dinner. These include the Charles A. Munroe Award, the McCall Award, the Million Man Hour awards, and the Prize Paper Contest awards.

The Association's Finances will be summarized in the report of the treasurer, Ernest R. Acker, president, Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y., at the first general session. At this same session, the report of the General Nominating Committee will be presented and the election of officers held.

Health Expert To Speak

Stressing "Nutrition for Defense," the Home Service Breakfast on Tuesday morning under the leadership of Albertine Berry, chairman, A. G. A. Home Service Committee, will provide a program of extreme interest not only for home service women but also for company executives and those particularly interested in sales promotion. The universally important subject of vitamins and minerals will be discussed by J. Ernestine Becker, associate of Dr. E. V. McCullum, in the School of Hygiene and Public Health at Johns Hopkins and with him co-author of the book, "Food, Nutrition and Health." Another feature of this program will be the presentation of new ideas and applications of home service procedures by Helen Smith of the Rochester Gas and Electric Corporation.

Defense Symposiums Stand Out

Characteristic of many of this year's sectional meetings are panel discussions and symposiums at which outstanding gas industry experts will discuss the problems of the gas utilities in the defense program. The Natural Gas Section on Monday afternoon will feature a group discussion of this type with the following participants, each representing a geographical area of the country: Pacific Coast—A. F. Bridge, vice-president, Southern Counties Gas Co., Los Angeles; Southwest—R. H. Hargrove, vice-president, United Gas Pipe Line Co., Shreveport; Middlewest—B. R. Bay, president, Northern Natural Gas Co., Omaha; Appalachian—C. E. Bennett, president, The Manufacturers Light & Heat Co., Pittsburgh; and Great Lakes—J. W. Batten, Michigan Consolidated Gas Co., Detroit. Each of these executives will discuss operating problems peculiar to their areas and additional discussion will be invited from the floor.

F. M. Banks

A. F. Bridge

R. H. Hargrove

Burt R. Bay

J. W. Batten

R. L. Fletcher

Herman Russell

Edward J. Tucker

Walter C. Beckjord

J. V. Strange

Louis Ruthenburg

Robert A. Hornby

The Industrial and Commercial Gas Section sessions are likewise designed to bring the gas men up-to-the-minute portraits of industrial gas at work in our national defense tooling up program as well as the latest sales material on various phases of commercial gas. A particular feature of the Monday sessions which will open with Chairman Wolf's address will be an executive panel discussion on "Industrial Gas at Work in Production for National Defense." Seven outstanding utility and manufacturer company members who will take part in this meeting are: Herman Russell, president, Rochester Gas & Electric Corp.; Edward J. Tucker, general manager, Consumers Gas Co. of Toronto; Walter C. Beckjord, vice-president and general manager, Columbia Gas & Electric Corp.; J. V. Strange, vice-president, United Public Service Co., Houston; Frank H. Adams, president, Surface Combustion Corp., Toledo; F. M. Banks, vice-president, Southern California Gas Co., and R. L. Fletcher, vice-president, Providence Gas Company. The summary by Chairman Wolf of views brought by these men from varying sections of the country will give a thrilling picture of gas in national defense factories. The Tuesday afternoon session of the Industrial and Commercial Gas Section group will be devoted entirely to getting and keeping the profitable commercial gas business.

Sales Plans During Emergency

The Residential Section's program also features a panel discussion of five or six sales managers or other executives who will answer questions on sales plans and policies resulting from the national emergency which have been solicited from forty or fifty companies throughout the country. Together with addresses from the utility and manufacturers' viewpoints, the national sales picture under the new conditions will be presented from every angle. The second session of the Residential Section will consist of a prevue of 1942 committee activities, the presentation of range and refrigeration awards which were won in national programs this past year, and an address by Harry G. Moock, vice-president, Plymouth Motor Corp., on "Sales Promotion for the Duration."

Two full sessions, Monday morning and Tuesday afternoon, are planned by the Technical Section for penetrating reviews of the outstanding operating problems facing the gas companies. Under the chairmanship of D. P. Hartson, Equitable Gas Company, Pittsburgh, the first meeting will be devoted to reports of the following committees: Chemical, Distribution, Gas Production, Gas Conditioning and Motor Vehicles. A special part of this program has been set aside for national defense problems and it is expected to have an outside authority discuss this question from firsthand experience. The second session will consist of four papers on operating problems of paramount interest.

The Accounting Section program has been built principally around the luncheon conferences which have proved so

Atlantic City—Setting for the Twenty-Third Annual Meeting of the American Gas Association

successful in the past. Seven of these conferences will be held simultaneously on Tuesday, divided as follows: Customer Accounting, Customer Collections, Customer Relations, General Accounting, Property Records, Depreciation Accounting, Taxation Accounting and Insurance. In addition there will be a business meeting on Monday morning at which officers will be elected and Chairman E. N. Keller's report presented.

Following are the detailed general and sectional programs:

GENERAL SESSIONS

Tuesday Morning, October 21, 10:00 A.M.

BALLROOM—AUDITORIUM

Treasurer's Report—Ernest R. Acker, President, Central Hudson Gas and Electric Corp., Poughkeepsie, N. Y.

Election of Officers.

Survival Value—F. Alexander Magoun, Professor of Human Relations, Massachusetts Institute of Technology, Cambridge, Mass.

Presidental Address—The National Defense and the American Gas Association, Major T. J. Strickler, Vice-President and General Manager, Kansas City Gas Company, Kansas City, Mo.

Executive Session at Noon.

Tuesday Evening, October 21, 7:30 P.M.

AMERICAN ROOM—HOTEL TRAYMORE

General Dinner by Subscription.

Association Awards by President Strickler.

Address—The Faith of America, Dr. Norman V. Peale, Pastor, Marble Collegiate Church, New York, N. Y.

Wednesday Morning, October 22, 10:00 A.M.

BALLROOM—AUDITORIUM

Promotional Policies in the National Emergency, H. Carl Wolf, President, Atlanta Gas Light Company, Atlanta, Ga.

Emergency and Post Emergency Research Programs—F. Marion Banks, Vice-president, Southern California Gas Company, Los Angeles, Calif.

Gas Institute of Technology—Dr. H. T. Heald, President, Illinois Institute of Technology and Institute of Gas Technology, Chicago, Ill.

Mobilizing for National Defense—Hugh H. Clegg, Assistant Director, Federal Bureau of Investigation, Washington, D. C.

Wednesday Afternoon, October 22, 12:30 P.M.

AMERICAN ROOM—HOTEL TRAYMORE

General Luncheon by Subscription.

Address by Utility Executive.

Final Adjournment.

NATURAL GAS SECTION

Monday Afternoon, October 20, 2:30 P.M.

HOTEL TRAYMORE—AMERICAN ROOM

H. D. Hancock

Presiding: H. D. Hancock, Chairman, Natural Gas Section, American Gas Association, President, Gas Advisers, Inc., New York, N. Y.

Opening Remarks by the Chairman.

Committee Reports and Announcements.

Election of Officers.

Report of Main Technical and Research Committee—Howell C. Cooper, Chairman, Sewickley, Pennsylvania.

Alternative and Auxiliary Gases from Liquefied Petroleum Products—C. George Segeler, Engineer of Utilization, American Gas Association, New York, N. Y.

England—Its Civilian Protection and Gas Utility Operations in Wartime—Davis M. DeBard, Vice-president, Stone & Webster Service Corp., New York, N. Y.

Panel Discussion—Regional Problems Presented to Gas Utilities in the Defense Program.

The Pacific Coast—A. F. Bridge, Vice-president, Southern Counties Gas Co., Los Angeles, Calif.

The Southwest—R. H. Hargrove, Vice-president, United Gas Pipe Line Co., Shreveport, La.

The Middlewest—B. R. Bay, President, Northern Natural Gas Co., Omaha, Neb.

The Appalachian—C. E. Bennett, President, The Manufacturers Light & Heat Co., Pittsburgh, Pa.

The Great Lakes—J. W. Batten, Vice-president, Michigan Consolidated Gas Co., Detroit, Mich.

ACCOUNTING SECTION

BUSINESS MEETING

Monday Morning, October 20, 11:00 A.M.

TRELLIS ROOM—RITZ-CARLTON

E. N. Keller

Report of Chairman—E. N. Keller, Philadelphia Electric Co., Philadelphia, Pa.

Report of Nominating Committee—F. B. Flahive, Chairman, New York, N. Y.

Election and Induction of Officers and transaction of such other routine business as may come before the meeting.

LUNCHEON CONFERENCES

Tuesday, October 21, 12:30 P.M.

RITZ-CARLTON

Because of their popularity and informality, seven luncheon conferences have been arranged, each covering distinct phases of accounting activity. The large number of conferences should hold the attendance of each to the point where much informal discussion is possible.

In accordance with customary practice, no minutes will be kept of the conferences.

Luncheon tickets will be on sale at the registration desk in the Ritz-Carlton Hotel Lobby, Monday and Tuesday, October 20-21.

CUSTOMER ACCOUNTING

Luncheon No. 1—Main Dining Room, Second Floor, D. E. Maloney, Chairman, Cleveland, Ohio.

CUSTOMER COLLECTIONS

Luncheon No. 2—Trellis Room, Third Floor, Harold F. Quad, Chairman, Newark, N. J.; Herbert E. Cliff, Discussion Leader, Newark, N. J.

CUSTOMER RELATIONS

Luncheon No. 3—Terrace, Second Floor, Harry Jeffs, Chairman, Far Rockaway, N. Y.

GENERAL ACCOUNTING

Luncheon No. 4—Blue Room, Third Floor, O. H. Ritenour, Chairman, Washington, D. C.

PROPERTY RECORDS

Luncheon No. 5—Green Room, Third Floor, E. F. Wressell, Chairman, Hammond, Indiana.

DEPRECIATION ACCOUNTING

Luncheon No. 6—Gold Room, Third Floor, H. C. Hasbrouck, Chairman, New York, N. Y.

TAXATION ACCOUNTING

Luncheon No. 7—Loggia, Second Floor, R. M. Campbell, Chairman, New York, N. Y.

INSURANCE COMMITTEE

Tuesday Afternoon, October 21, 2:00 P.M.

In Parlor To Be Announced—RITZ-CARLTON

Reginald Fleming, Chairman, New York, N. Y.

INDUSTRIAL & COMMERCIAL GAS SECTION

Monday Morning, October 20, 9:30 A.M.

ROSE ROOM—HOTEL TRAYMORE

J. P. Leinroth, Chairman, Program Committee, Public Service Electric & Gas Company, Newark, N. J.

H. Carl Wolf

Presiding: H. Carl Wolf, Chairman, Industrial & Commercial Gas Section, President, Atlanta Gas Light Company, Atlanta, Ga.

The Chairman's Opening Address—Mr. Wolf.

Report of the Nominating Commit-

tee—Franklin T. Rainey, Chairman, The Ohio Fuel Gas Co., Columbus, Ohio.

Election of Officers.

A Series of Talks by Company Executives On:

Industrial Gas at Work in Production for National Defense

Frank H. Adams, President, Surface Combustion Corp., Toledo, Ohio.

F. M. Banks, Vice-president, Southern California Gas Co., Los Angeles, Calif.

Walter C. Beckjord, Vice-president and Gen. Mgr., Columbia Gas & Electric Corp., New York, N. Y.

R. L. Fletcher, Vice-president, Providence Gas Company, Providence, R. I.

Herman Russell, President, Rochester Gas & Electric Corp., Rochester, N. Y.

J. V. Strange, Vice-president, United Gas Corp., Houston, Texas.

Edward J. Tucker, Director and Gen. Mgr., Consumers Gas Co. of Toronto, Ontario, Canada.

Tuesday, October 21, 2:00 P.M.

Presiding: H. Carl Wolf, Chairman, Industrial & Commercial Gas Section, President, Atlanta Gas Light Company, Atlanta, Ga.

Increasing Your Heating Business in Commercial Establishments—Elroy L. Payne, Vice-president and Gen. Mgr., Payne Furnace & Supply Co., Ltd., Beverly Hills, Calif.; Charles F. Spicer, Moore Corporation, Columbus, Ohio.

Opportunities I See for Selling Commercial Gas—O. F. Keune, Sales Manager, Florida Power & Light Co., Miami, Fla.

The New Counter Gas Appliances—Your Tools for Future Business—See 'Em! Know 'Em! Sell 'Em!—Emil Carl Sorby, Promotion Director, George D. Roper Corp., Rockford, Ill.

(Mr. Sorby will make a dramatic demonstration of many of the new, modern, attractive counter gas appliances and show you how they can be successfully promoted.)

A. G. A. COMBINED INDUSTRIAL GAS EXHIBIT

National Metal Congress and Exposition

October 20-24

Municipal Auditorium
Philadelphia, Pa.

Thursday, October 23, is Industrial Gas Day

All delegates to the Annual Meeting are invited by the Industrial & Commercial Gas Section to visit, on their way home, this large, interesting and instructive Exhibit of Industrial Gas Equipment for the Defense Industries. Exhibit opens daily from 12 noon to 10:30 P.M., except Thursday when it closes at 6:00 P.M.

RESIDENTIAL SECTION

Monday Morning, October 20, 10:00 A.M.

AMERICAN ROOM—HOTEL TRAYMORE

R. J. Rutherford

Presiding: R. J. Rutherford, Chairman, Residential Gas Section, American Gas Association; Vice-president, Worcester Gas Light Company, Worcester, Mass.

The Chairman's Address—Mr. Rutherford.

Report of the Nominating Committee—Davis M. DeBard, Vice-president, Stone & Webster Service Corp., New York, N. Y.

Election of Officers.

"Sales Plans and Policies During the Emergency"—Clifford E. Paige, President, The Brooklyn Union Gas Company, Brooklyn, N. Y.

Panel Discussion—Fifty representative gas companies in various parts of the United States have submitted questions regarding sales plans and policies which are of greatest importance to their companies, for discussion by the sales executives who will participate in this Panel Discussion. Among those who will participate are:

N. B. Bertolette, President, The Hartford Gas Company, Hartford, Conn.; J. P. Leinroth, Public Service Electric & Gas Co., Newark, N. J.; F. M. Rosenkrans, New Business Manager, The Gas Service Company, Kansas City, Mo.; Robert A. Hornby, Vice-president, Pacific Lighting Corporation, San Francisco, Calif.; D. A. Hulcy, President, Lone Star Gas Company, Dallas, Texas; John McLaverty, Consumers Gas Co. of Toronto, Ont.; Louis Ruthenburg, President, Servel, Inc., Evansville, Indiana.

"What's Ahead from the Appliance Manufacturer's Viewpoint"—H. T. Ryan, Member, Defense Committee; Association of Gas Appliance and Equipment Manufacturers; Vice-president, Robertshaw Thermostat Co., Youngwood, Pa.

Tuesday Afternoon, October 21, 2:00 P.M.

Presiding: E. J. Boyer, Vice-chairman, Minneapolis Gas Light Company, Minneapolis, Minnesota.

"Sales Promotion for the Duration"—Harry G. Moock, Vice-president, Plymouth Motor Corp., Detroit, Mich.

"Residential Sales Prevue—W. M. Chamberlain, Chairman, Domestic Range Committee; C. V. Sorenson, Chairman, Refrigeration Committee; W. L. Jones, Chairman, House Heating and Winter Air Conditioning Committee; Jack Torbert, Chairman, Water Heating Committee; Helen A. Smith, Chairman, Home Service Committee; Marcy L. Sperry, Chairman, Housing and Realty Projects Committee; Lester Ginsburg, Chairman, Appliance Financing Committee; Hall M. Henry, Chairman, Market and Economic Research Committee; J. M. McCaleb, Chairman, Sales and Service Relations Committee; Delbert S. Ford, Chairman, Window and Store Display Committee; George L. Cullen, Chairman, Special Promotional Exhibits and Activities Committee; John H. Warden, Chairman, Community Development Committee; Chairman, Committee for Improving Domestic Gas Appliances.

Presentation of Range Awards—George L. Scofield, Chairman, Domestic Range Committee.

Presentation of Refrigeration Awards—B. T. Franck, Chairman, Refrigeration Committee.

HOME SERVICE BREAKFAST

Tuesday Morning, October 21, 8:00 A.M.

HOTEL TRAYMORE—AMERICAN ROOM

Albertine Berry

(You are *urgently requested* to purchase tickets before 5:00 P.M. on Monday, October 20th, at the A. G. A. Registration Desk in the Hotel Traymore.)

Presiding, Albertine Berry, Chairman, Home Service Committee, Lone Star Gas Company, Dallas, Texas.

Greetings: T. J. Strickler, President, Alexander Forward, Managing Director; R. J. Rutherford, Chairman, Residential Section, American Gas Association.

Nutrition for Defense:

DO YOU KNOW?—The What and Where, —and How To Save Vitamins and Minerals, J. Ernestine Becker, Johns Hopkins University, Baltimore, Maryland.

HOME SERVICE IN THE EMERGENCY—Helen A. Smith, Rochester Gas & Electric Corp., Rochester, N. Y.

TECHNICAL SECTION

Monday Morning, October 20, 10:00 A.M.

HADDON HALL

D. P. Hartson

Address of Chairman—D. P. Hartson, Equitable Gas Company, Pittsburgh, Pa.

Report of Nominating Committee—F. M. Goodwin, Chairman, Newton Centre, Mass.

Report of Chemical Committee—E. L. Sweeney, Chairman, Boston Consolidated Gas Company, Everett, Mass.

(Continued on page 368)

Gas House Heating ... *Diversified Demand and Consumption Data from Actual Tests*

By JOHN H. PILKINGTON
Manager—Technical Bureau
and
GORDON E. GARNHART
Division Engineer—Technical Bureau
Research and Development Department, Consolidated Edison Company of New York, Inc.

John H. Pilkington

Gordon E. Garnhart

THE company with which the authors are connected has been promoting gas house heating for a number of years. During this period considerable data on annual gas consumptions have been accumulated, but most of the essential demand characteristics and relationships, including diversity and coincidence of the heating peak with other gas utilizations, have been estimated. The field tests described in this article were undertaken in order to get a check on the reliability of these estimates.

Character of Houses Tested

The total gas demand for a suburban development of about ninety new single family houses, 97% of which used gas for space heating, was recorded on a graphic meter for a twelve months' period including the 1939-40 heating season.

Although the quality of the houses and the economic level of the residents are somewhat above average, they are believed to be fairly representative of gas heated homes in this area. Moreover, it is felt that the demand characteristics and general relationships between demand and consumption established by this test can be applied with appropriate adjustments to more modest homes.

Besides the very fortunate circumstance of finding such a large group of houses with nearly a 100 per cent saturation of gas space heating, it can be seen from Fig. 2 that the layout of the gas mains serving this group of houses afforded a unique opportunity for the measurement of the total diversified demand on one meter, which could be installed on the single 6-inch high pressure supply main feeding this development.

Descriptive data on the sizes, heating requirements and assessed valuations of these houses are given in Table 1. Some idea of their outside appearances can be obtained from Fig. 2. The major appliance saturations are listed in Table 2.

Purpose of Tests

The aim of these tests was to obtain diversified demand information of the sort presented in Figs. 3 to 9 inclusive. Until these data became available, we knew very little about the timing of the morning heating peak, and the amount of diversity which could be expected during the warm-up period on very cold mornings among house

• For a group of about 90 single-family houses, nearly all of which used gas for space heating, the total diversified demand was recorded for an entire year. From these demand records typical daily load curves, diversity characteristics, relationships between diversified hourly and daily demands and temperature, etc., have been constructed. In addition, curves showing how gas consumption per house per degree day below 65° F. varies with the heat requirements of houses expressed in sq. ft. of C.I.S.R., have been derived for the test houses and for over a thousand others by extensive bill analyses.

TABLE 1
HOUSE SIZES, HEAT REQUIREMENTS AND ASSESSED VALUATIONS

Rooms per House	*No. of Houses*	*Average Sq.Ft. C.I.S.R.*	*Average Assessed Value**
5	1	210	$ 7,200
6	32	257	8,600
7	46	316	10,400
8	9	345	10,900
9	2	437	11,200
6.77	90	300	$ 9,800

* Roughly 70% of original selling prices.

TABLE 2
GAS APPLIANCE SATURATIONS

Cooking	97% Gas (3% Electric)
Refrigeration	42% Gas (58% Electric)
House and Water Heating	97% Gas (3% Oil)

TYPICAL HOUSES IN TEST GROUP

FIG. 1

FIG. 2

WINTER DAILY LOAD CURVES

FOR

87 SINGLE FAMILY HOUSES

FOR THE WEEK OF JANUARY 15–21, 1940

GAS APPLIANCES:–84 HOUSE HEATERS, 84 WATER HEATERS, 84 RANGES, AND 35 REFRIGERATORS

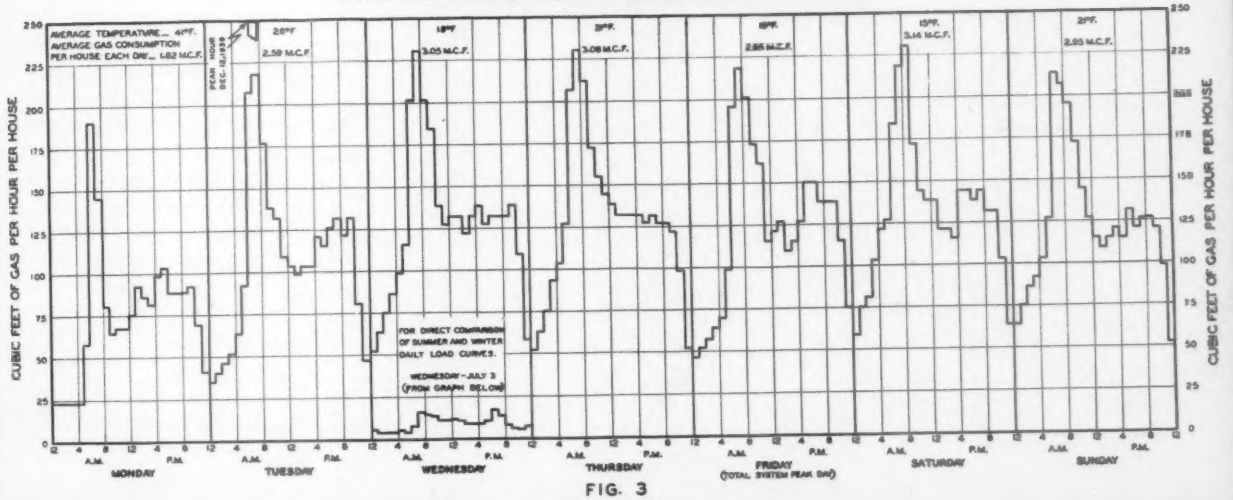


FIG. 3

SUMMER DAILY LOAD CURVES

FOR

90 SINGLE FAMILY HOUSES

FOR THE WEEK OF JULY 1–7, 1940

GAS APPLIANCES:–87 WATER HEATERS, 87 RANGES, AND 37 REFRIGERATORS

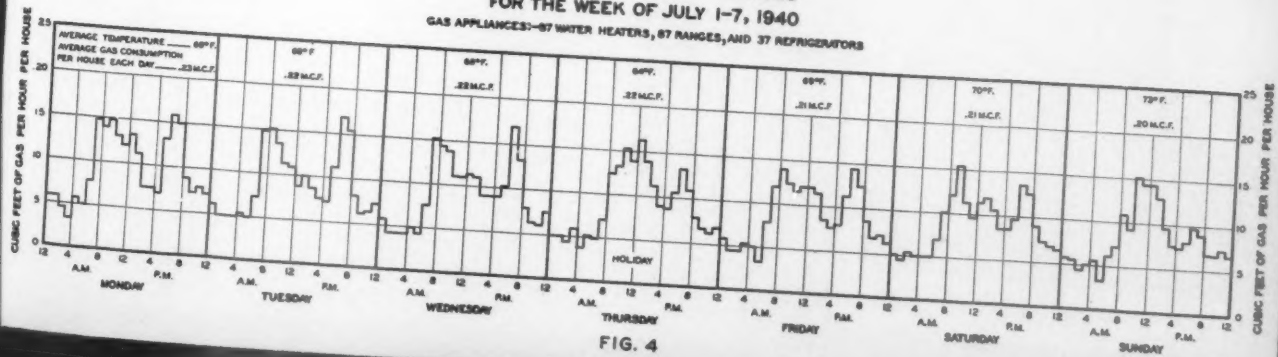


FIG. 4

heaters and between the house heating load and other residential use. According to Fig. 3, the winter daily load curves show that the maximum hourly demand for house heating customers comes in the morning, usually between 6:00 and 8:00 A.M.

Naturally, the higher the gas house heating saturation the more pronounced will be this morning peak. With the help of daily load curves for different temperatures, such as shown in Fig. 5, it has been estimated that a house heating saturation of less than 10 per cent would be enough to establish in a single-family house area a morning peak demand higher than the prevailing peak which now comes at noon on Thanksgiving or Christmas when the holiday cooking load reaches its peak.

Hourly Demand Responsibility

The three curves in Fig. 6 indicate how the instantaneous, integrated fifteen minute and hourly maximum demands for about 85 gas house heaters vary with morning temperature. Apparently reductions in temperature below 20° F. cause very little increase in the peak demand. It should be explained that each of these demand curves represents the upper envelope of nearly 240 points (one point for each day of heating), and thus represents the highest demand likely to be experienced at any given temperature under worst wind conditions. The three demand curves are given because in the design of certain distribution facilities the peak demand for some interval shorter than an hour is considered more significant than the maximum hourly demand.

TABLE 3
MAXIMUM GROUP DEMANDS

	Time	Total Gas* Demand 87 Houses	Gas Demand for Heating Only 84 House Heaters Total	Per House	Diversity†
Max. Instantaneous	7:15 a.m.	24.3 M c.f./hr.	22.8 M c.f./hr.	271 c.f./hr.	1.14
Max. 15 minute	7:00-7:15 a.m.	22.6 M c.f./hr.	21.2 M c.f./hr.	253 c.f./hr.	1.22
Max. Hourly	6:45-7:45 a.m.	21.5 M c.f./hr.	20.0 M c.f./hr.	238 c.f./hr.	1.30

* Manufactured gas—537 B.t.u./c.f.
† The measured burner capacity which averaged 308 c.f./hr. has been taken as the average individual maximum demand and has been divided by the diversified demands per house to obtain these diversity factors.

The maximum gas demands recorded during the entire test year did not come during the week of January 15-21, 1940, covered in Fig. 3, but occurred on Tuesday morning, December 12, 1939, when the temperature was about 20° F. and a stiff north wind was blowing. All three demands —instantaneous, fifteen minute and hourly—reached their maxima on that morning. The test figures are given in Table 3.

The diversity characteristic shown in Fig. 7 had to be derived, of course, by resorting to the well-known statistical device of combining daily load curves for several similar days to obtain the diversified demand points representing larger groups of houses than the test group of eighty-five. The reliability of this diversity curve hangs upon the presumption that for a group of 85 customers the diversity introduced by combining load curves for 10 days having about the same average 24-hour temperature, but appreciably different temperature variations over the day, wind intensity, solar radiation, humidity, etc., would closely approximate the diversity experienced on the peak day among 850 customers widely distributed as to both geographic location and economic level.

Adjustments have been made in the derivation of the diversity curve in Fig. 7 to eliminate the gas demand for all uses except house heating and to make the resulting heating demands apply to a 0° F. morning. To make the curve independent of house size or

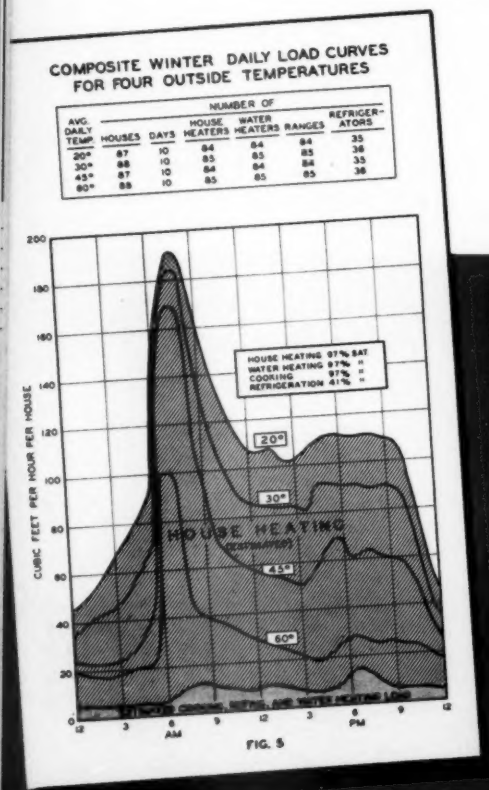


FIG. 5

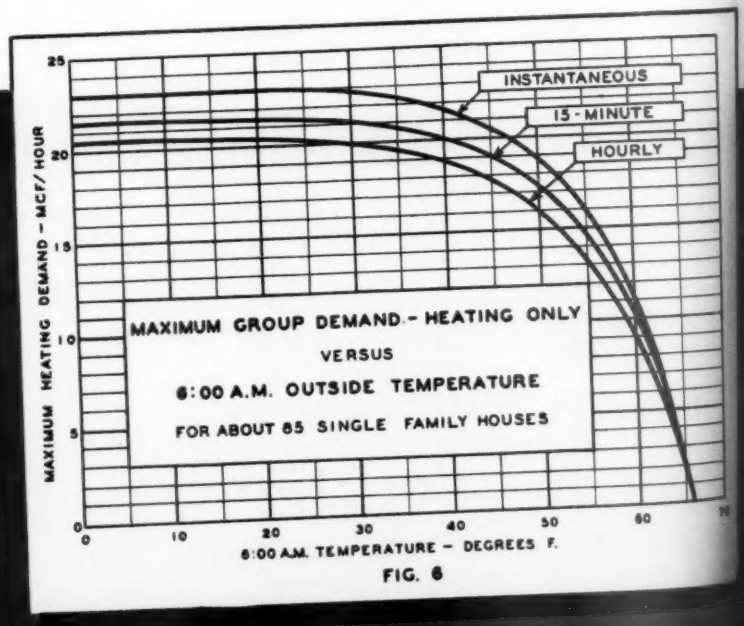
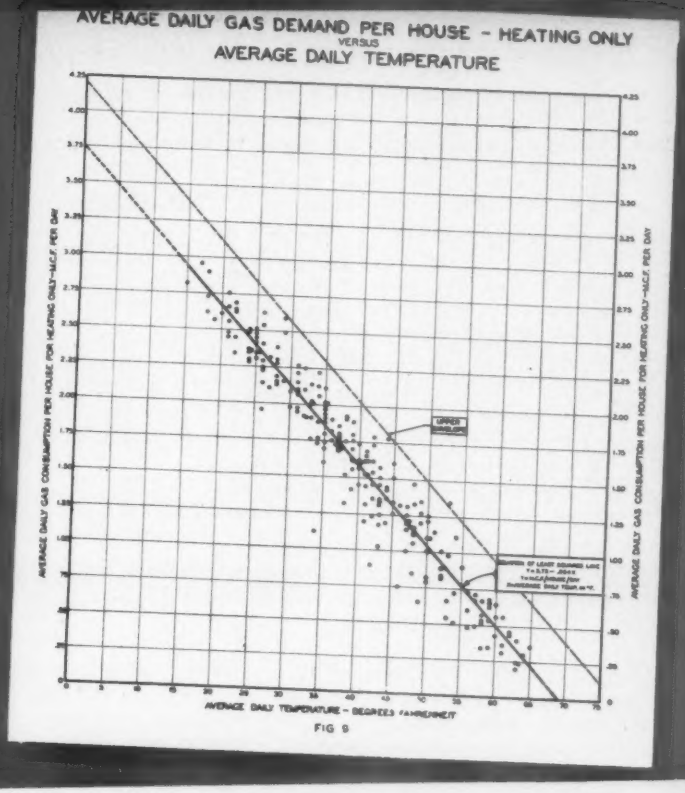


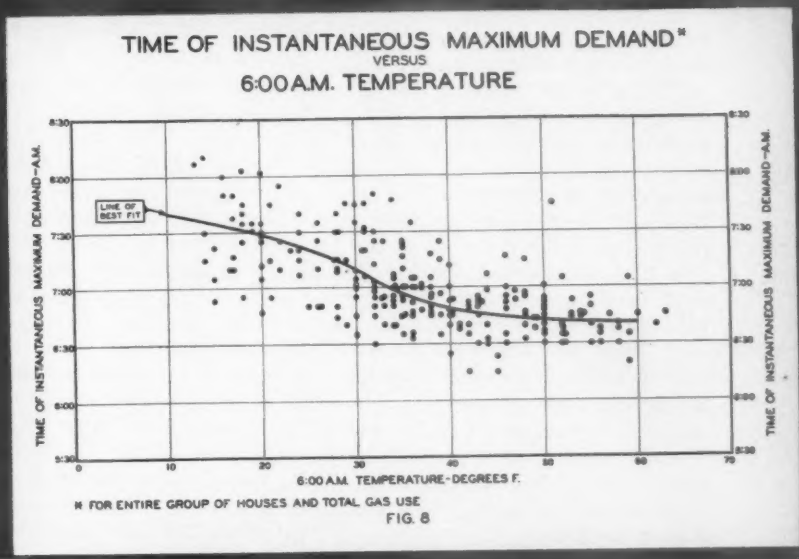
FIG. 6

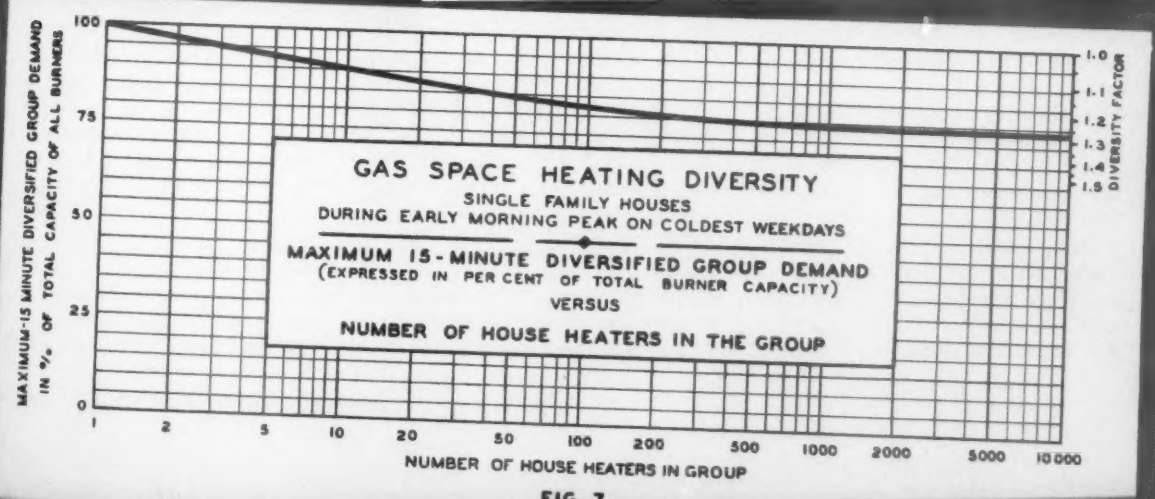
heating requirements, the diversified demand has been expressed in per cent of total measured burner capacity rather than in M c.f. per hour. Measured rather than manufacturer's nominal rated capacity was used because some of the burners had been set for lower than rated consumption. All these houses used clock-controlled thermostats most of which were set for about 60° F. at night from 11:00 p.m. to 6:00 a.m., and at 70°-72° F. or higher during the day.

With regard to the effect of outside temperature on the timing of the morning peak, the curve in Fig. 8 should be illuminating. The tendency of the peak to come later on the coldest mornings is due presumably to the loss at low temperatures of the diversity normally arising from difference in the time settings of the furnace thermostats. That is, with a longer warm-up period of operation required on extremely cold mornings, the furnaces with the earliest settings will still be operating when those with the latest settings finally come on. This results, incidentally, in a greater degree of coincidence between the house heating peak and the morning cooking and water heating peak as the days grow colder. This effect is evident in Fig. 5.

The "hourly load factor" for house heating (average hourly consumption for a normal heating year divided by the maximum integrated hourly demand at a temperature of 0° F. diversified for a group of 10,000 customers) is about 15 per cent. This compares with an "hourly load factor"


AVERAGE DAILY GAS DEMAND PER HOUSE - HEATING ONLY
VERSUS
AVERAGE DAILY TEMPERATURE
AVERAGE DAILY GAS CONSUMPTION PER HOUSE FOR HEATING ONLY-M.C.F. PER DAY
AVERAGE DAILY TEMPERATURE - DEGREES FAHRENHEIT
UPPER ENVELOPE
LINE OF BEST FIT
FIG 9


TIME OF INSTANTANEOUS MAXIMUM DEMAND*
VERSUS
6:00 A.M. TEMPERATURE
TIME OF INSTANTANEOUS MAXIMUM DEMAND-A.M.
LINE OF BEST FIT
6:00 A.M. TEMPERATURE-DEGREES F.
* FOR ENTIRE GROUP OF HOUSES AND TOTAL GAS USE
FIG. 8


GAS SPACE HEATING DIVERSITY
SINGLE FAMILY HOUSES
DURING EARLY MORNING PEAK ON COLDEST WEEKDAYS
MAXIMUM 15-MINUTE DIVERSIFIED GROUP DEMAND
(EXPRESSED IN PER CENT OF TOTAL BURNER CAPACITY)
VERSUS
NUMBER OF HOUSE HEATERS IN THE GROUP
MAXIMUM-15 MINUTE DIVERSIFIED GROUP DEMAND IN % OF TOTAL CAPACITY OF ALL BURNERS
DIVERSITY FACTOR
NUMBER OF HOUSE HEATERS IN GROUP
FIG. 7

GAS CONSUMPTION FOR HEATING ONE-FAMILY HOUSES

CU. FT. OF GAS ACTUALLY CONSUMED PER DEGREE-DAY BELOW 65°F

VERSUS

RADIATION REQUIRED IN EACH HOUSE ACCORDING TO INDIVIDUAL HEATING SURVEYS

STEAM SYSTEMS

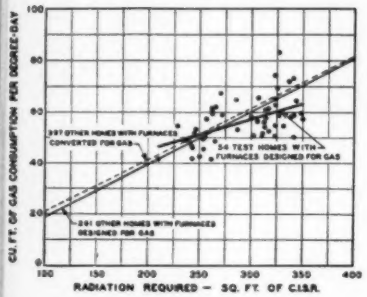


FIG. 10

WARM AIR SYSTEMS

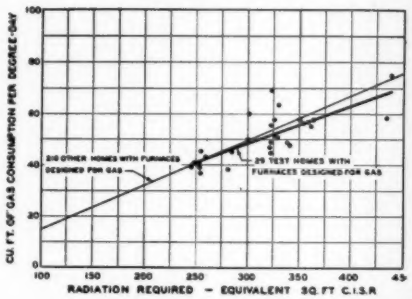


FIG. 11

of about 20 per cent for gas cooking, 50 per cent for all-year water heating and also for refrigeration.

Daily Demand Responsibility

The total daily gas consumption of the development ranged from 15 M c.f. per day in the summer to 285 M c.f. in the winter. Since gas may be stored in sufficient quantities to handle wide variations in hourly demand, manufacturing plant capacity requirements are based upon the gas system's maximum twenty-four hour send-out rather than upon the instantaneous or hourly maximum send-outs. Due to the large amount of incidental heating load already being served by most gas systems, it is already the usual thing for the day of maximum twenty-four hour send-out to occur on the coldest and windiest week day. Hence, new house heating business must be regarded as fully on-peak with respect to gas production facilities.

In Fig. 9 the daily heating consumption or demand per house (after eliminating the estimated cooking, refrigeration and water heating use) has been plotted for each heating day during the test year against the twenty-four hour average outside temperature. The result is evidently a straight line relationship. The scattered appearance of the individual points in Fig. 9 gives an offhand impression of considerable dispersion; but this dispersion is merely indicative of the number and importance of factors other than temperature which affect the daily consumption, such as wind velocity and direction, sunshine, the tendency to open windows during the warmer periods of mild days, etc. The coldest average daily temperature encountered during the test period happened to be 15° F., but a gas system in this region must be designed to handle without excessive strain the send-out expected on a 0° F. day.

Extending the dashed line on Fig. 9 to 0° F. would make the diversified maximum daily house heating demand for this group of houses about 4.2 M c.f. per house. The average burner capacity in this development is about .308 M c.f. per hour. Thus on a 0° F. day the diversified daily demand amounts to nearly fourteen times the average measured burner capacity. The "daily load factor" for gas house heating (average daily consumption during a normal year divided by the consumption on a 0° F. day) is about 25 per cent. This "daily load factor" is extremely poor in comparison with that of other gas appliances. The "daily load factors" for gas ranges, refrigerators and all-year water heaters are all in the neighborhood of 65 per cent, and the combination "daily load factor" for all three appliances is over 80 per cent.

Before leaving Fig. 9, several interesting points should be stressed. In the first place, the line of best fit seems according to statistical analysis to be a straight line all the way from 15° F. to 65° F. However, this line intercepts the zero consumption axis at an average daily temperature of 69° F. rather than at 65° F., the generally accepted temperature level above which there is supposed to be no space heating required. The fact that it is a straight line throughout indicates that the heating consumption per degree-day in the warmer months of the heating season is not appreciably greater than in the coldest winter months. The probable reason for this is that the fall-off in boiler efficiency in the warmer months is about off-set by the increase in relative significance in mild weather of incidental sources of heat such as ranges, refrigerators, water heaters, lights, people, solar radiation, etc.

This straight line relationship may be construed as substantiating the common practice of assuming a constant consumption per sq.ft. of CISR per degree-day, regardless of season, in estimating heating consumptions for new installations. However, the fact that this line cuts the horizontal axis at 69° F. does not appear to substantiate the commonly accepted use of 65° F. as the datum temperature for figuring the degree-days of heating required per season for houses of this type.

Annual Heating Consumption

All the houses in the test group were of good tight construction and were insulated with ½ inch celotex on the side walls and 4 inches of rock wool under the roof. The annual gas consumption required in a normal year to heat a given house, taking into account its size, exposure to wind, quality of construction, extent insulated, etc., is a direct function of the estimated sq.ft. of CISR required for that house. Factors not taken into account in the CISR estimate, but which would affect the annual gas consumption in a particular house, might be heat waste by careless use of doors and windows, maintenance by the occupants of abnormally high or low inside temperature, unusually poor furnace efficiency, etc. Other factors which may cause some of the scatter of individual points in Figs. 10 and 11 are inaccuracies in the estimates of other than heating consumption which had to be subtracted from the total annual gas use to get the heating consumption; also in-

accuracies in the individual heating survey estimates of required sq.ft. CISR.

The light reference lines in Figs. 10 and 11 were derived from a recent analysis of heating consumptions in nearly 1100 single family houses in New York City (the test houses were not included). The dashed reference line in Fig. 10, representing steam systems with converted furnaces, is included merely to show how the performance of conversion installations compares with gas designed jobs. Reference lines covering gas designed and converted hot water house heating systems and converted warm air installations are not shown in Figs. 10 and 11 because there were less than 100 houses representing each of these heating systems among the 1100 gas heated homes analyzed.

The slight disalignment of the heavier test group lines with respect to the reference lines is not considered significant, because it would probably be found that the individual least squares line of any small group of points included in the main reference line would deviate as much.

By using gas consumption per house per degree day below 65° F. in Figs. 10 and 11 instead of annual gas consumption per house, the effects of temperature variations from year to year and place to place are eliminated, but the effects of peculiar local conditions of wind, humidity, solar radiation, etc., still remain and probably account for some of the disalignment between the reference and test group lines.

In conclusion, it is recognized that the test results presented in this article represent only a small contribution to the store of diversified demand data on gas appliances which the industry must eventually accumulate. It is hoped, therefore, that this effort will prompt others to publish similar material as soon as it becomes available, so that studies dealing with the economics of gas space heating and other major forms of gas utilization can be made on a sounder basis.

New Preference Rating Order Provides for Utility Maintenance and Supplies

THE long awaited preference rating order P-46 providing maintenance, repairs and supplies for utilities was issued by the Priorities Division of the Office of Production Management September 17, effective immediately, and expiring March 31, 1942, unless revoked. The procedure is apparently greatly simplified. The gas company executes the acceptance of the rating order P-46 on a blank attached to the new order, files one copy with OPM (this will be facilitated if sent to George W. Bean, American Gas Association, Albee Building, Washington, D. C.), and retains the other copy.

The order assigns the A-10 rating for delivery of maintenance and repair material and operating supplies which are vitally needed for defense and essential public service. One of the definitions of "producer" is any individual, partnership, association, corporation or governmental unit supplying gas, natural or manufactured, directly or indirectly for general use by the public.

Operating supplies, maintenance and repair, as dealt with in the order do not include material to replace that which is still usable and do not include additions or expansions of property or equipment other than the connection of new customers and minor improvements needed for relief from overload and do not include the expansion of the service area.

Copies of the order may be obtained from American Gas Association offices in New York and Washington or from the regional headquarters of the Office of Production Management.

Project Ratings

It is understood that no formal orders covering a plan for project rating will be issued for the present. It will be administered by the Heat, Light and Power Section in the Materials Division of OPM under J. A. Krug. Those desiring project ratings should write to Mr. Bean giving complete details of the project; what, when, why. It may not necessarily relate solely to defense but defense will expedite it. If the request is approved there will be a certificate specifying a rating to be applied to everything on the priorities list needed for the work, thus obviating the need for separate ratings on defense items. If the project is not to be started immediately a non-defense rating will be assigned but it will nevertheless be in the record.

Utility Executives are purchasing rubber stamps for their endorsement of purchase orders for repairs, at A-10 rating, in accordance with the size and design they desire. The wording of the endorsement is fixed in preference rating order P-46, Section (d) (2).

The Priorities Division issued, September 22, preference rating order No. P-55 to facilitate the acquisition of materials for privately financed defense housing operations, effective that day. Apparently under this order the contractor can extend the preference rating to the gas company or any other suppliers.

Frederick W. Seymour Is Dead

FREDERICK WARNER SEYMOUR, president of the American Gas and Power Company and an executive of other utility companies, died Sept. 10 after a brief illness. He was fifty-four years old.

Mr. Seymour was born in Manistee, Mich., on July 22, 1887. He attended St. John's Military Academy in Delafield, Wis., and was graduated in 1909 from the University of Michigan with a degree of Bachelor of Science in chemical engineering.

The next year Mr. Seymour entered the utility business with the Grand Rapids (Mich.) Gas Light Company. Seven years later he became vice-president and general manager of the Battle Creek (Mich.) Gas Company. He remained as vice-president and director of the company while expanding other interests in the utility field.

In 1922 he acquired the controlling interest in a small gas company in Marshall, Mich., and later he bought other companies, which he organized into Federated Utilities, of which he was president and general manager. He sold the concern to the Central Public Service Corporation in 1927 when there were fourteen operating subsidiaries.

In 1927 Mr. Seymour became vice-president and consulting engineer of the American Commonwealth's Power Corporation. Five years later he assumed the presidency of the American Gas and Power Company, with large operating subsidiaries in the Mid-West, the South and New England. He was also president of the Public Utilities Management Corporation and the National Gas and Electric Corporation, and vice-president of the Dominion Gas and Electric Company.

The Paynes, Sr. and Jr.

THE A. G. A. MONTHLY has been taking undue liberty with the Payne family and hereby makes humble apology for an error on page 299 of the September issue. The photograph carried with the article "This New Radiant Heating" by Christy Payne, Jr., was not Mr. Payne, Jr. but Mr. Payne, Sr., as a number of their friends quickly informed the editor.

Industrial Gas Sales Mount as Defense Program Gains Momentum

By Edward R. Martin

Assistant Statistician, American Gas Association

THE TREND OF GAS SALES BY MANUFACTURED GAS COMPANIES OPERATING IN THE EASTERN SEABOARD STATES

	Percentage Change—1941-1940			
	Residential	*Commercial*	*Industrial*	*Total*
January	—5.2	—0.3	+17.1	—2.0
February	—0.8	+2.8	+25.6	+2.7
March	+3.4	+8.4	+27.2	+7.0
April	—0.3	+5.3	+23.7	+3.6
May	—3.6	—1.3	+30.9	+1.4
June	—0.8	—0.5	+37.5	+4.6
TOTAL 6 MONTHS	—1.2	+2.4	+26.7	+2.8

Estimates based on approximately 97 per cent of Manufactured Gas Industry in this area.

WHILE the controversy regarding the availability of oil to gas manufacturing companies in the Eastern Seaboard States during the present emergency continues, it is interesting to note the increased demands for industrial gas that are necessitated by industries involved in producing items vital to the National Defense Program.

The accompanying figures represent approximately 97 per cent of the total sales of manufactured gas in the Eastern Seaboard area. As expected the major portion of increased sales falls under the classification of "Industrial."

At the end of the first six months of 1941, industrial sales of manufactured gas in this area gained 26.7 per cent over the same period of 1940. Starting with an increase of 17.1 per cent in January, this class of sales showed progressively sharper increases when compared with last year's figures. In June, industrial sales reached a peak of 37.5 per cent more than they were in 1940.

Looking for the moment at the national picture, we find that at the end of the first six months the total manufactured gas sales for industrial purposes throughout the country registered an increase of 25.9 per cent. Natural gas sales for the same purpose and period were 15.9 per cent more than for the first half of 1940.

A change in load characteristics from the first six months of 1940 is noted insofar as during this period 75 per cent of the total sales were classified as residential and 25 per cent as non-residential. In 1941, the residential phase was reduced to 72 per cent and the non-residential was increased to 28 per cent of the total volume of sales in the Eastern Seaboard area.

Residential sales of manufactured gas along the Eastern Seaboard at the end of six months in 1941 were 1.2 per cent below the 1940 level. For all months, with the exception of March, residential sales have not equalled the 1940 standard, due in part to weather conditions. Commercial sales show a nominal increase of 2.4 per cent, recording wide variations when compared with corresponding months of last year.

Industrial sales, therefore, have been the major factor in governing the 2.8 per cent increase in total sales for this area. It is the supplying of industry which will be the gas companies' greatest job during the emergency. Governmental officials have recognized the essentiality of the gas industry and have given assurances that in all probability an adequate supply of petroleum products will be available to meet the production needs of these gas companies.

"London Makes a Start"

(From *The Gas Times*, London, July 12, 1941)

London gas companies need women workers to replace men called up for active service. Dozens are already employed, but many more are needed, especially on some of the works.

Women who had never worked outside their own homes are now busy in retort houses, and taking their turn on night shift; acting as bricklayer's or fitter's mates; loading oxide; painting purifiers, in fact doing a dozen man sized jobs. In most cases their children are evacuated and their husbands have joined up, so they are free to do war work.

For some occupations the women obviously have to be taught, while other work is skilled but requires less physical effort. Such jobs as testing gas meters, soldering, etc., are being done most efficiently by women and they are releasing lads under military age for service in aircraft factories. But it is surprising how all the women are tackling the unaccustomed work. Most of them say they have never felt so well in their lives.

On the works the women wear blue two-piece overalls, but the meter collectors look rather like postmen in their navy blue slacks and jackets, and jaunty red piped caps. The women on maintenance work wear the same jacket and cap but a skirt instead of slacks. Housewives express a little surprise when they first see these girls: "Lady gas men now, I see," is the usual comment, but they accept the women very kindly.

At Last—Somebody's Doing It

"A" said, "Sure, I've heard the saying, 'NOW YOU'RE COOKING WITH GAS' . . . . heard it again on the radio just a few nights ago, but what does it mean?" "B" replied, "I don't know. Does it mean something in connection with the Gas Company?"

It sure does, Mr. and Mrs. Gas Industry! The illustration below was reproduced from the large color two-way display which the Bishop Publishing Company furnishes to gas companies for use during the Fall months.

This display, along with the "top stars" who illustrate it, is designed to make the "NOW YOU'RE COOKING WITH GAS" slogan as popular as, say, "The Pause That Refreshes" or "Ask the Man Who Owns One." The stars shown—Fibber McGee and Molly, Jack Benny, Barbara Luddy and Les Tremayne, Lanny Ross, Doctor I. Q., Baby Snooks and Fred Allen, as well as many others, will no doubt be saying on numerous occasions during the 1941-42 radio season, "NOW YOU'RE COOKING WITH GAS." Here's your chance to tie-in with a popular slogan.

The Bishop Publishing Company, 155 East Superior St., Chicago, will furnish single or quantity prices upon request.

"Now you're cooking with Gas"
....THIS OLD SAYING, INDICATIVE OF SUCCESS WHEN USED IN CONNECTION WITH RADIO ACTORS MEANS THEY HAVE ARRIVED. ARE PLAYING BIG-TIME
SO HAVE MORE THAN
....they're cooking with Gas too!

Two-way display offered to gas companies for Fall advertising

Cooking—and the Gas Bill

By GRACE FORSCHNER

Home Service Department,
The East Ohio Gas Company,
Cleveland, Ohio

JUST exactly how much gas is required to do a month's cooking on a modern gas range has often been questioned. An actual determination of the answer has always been difficult as the installation of sufficient meters on gas ranges to get a true average is a considerable task.

This is the way our company went about it and got it done.

Several years ago three P.W.A. housing projects were opened up in the City of Cleveland with a total of about 1800 dwelling units. Gas is used only for cooking in these units and a separate gas meter was installed for each one. The tenants are required to pay their own gas bills. All these dwellings are equipped with the same make of modern gas range.

Average Gas Consumption

We found that for one year's operation the gas consumption per dwelling unit averaged 706 cubic feet of natural gas per month.

An interesting thing is that the one project of approximately 600 units which is occupied by colored people only, averaged slightly over 800 cubic feet of natural gas per month while the other two projects occupied entirely by white people averaged about 640 cubic feet of natural gas per month.

In scanning the detailed gas consumption of the various tenants it was noticeable that they varied from 200 cubic feet per month in the case of a few to 1500 cubic feet in the case of a few others. The question naturally arose in our minds as to how much cooking actually could be done by a present-day low-income family with a given amount of gas. The only manner in which this determination could be made was by actual interviewing of the occupants of one of these projects. We chose Lakeview Terrace because it was felt that the occupants of this particular project were a representative group.

Lakeview Terrace is situated on a hillside, close to the downtown section, where Cleveland's first Irish immigrants settled to be near the boat docks and the old Ohio and Erie Canal. The apartments command a view of ore unloading docks, steel freighters steaming into port and the activity of the shipbuilding yards.

Cross Section of Population

The 620 families are drawn from all localities and all nationalities. Irish predominate, closely followed by Germans with a good representation of Polish, English and Slovak. This government dwelling project is in reality a small town, (population 2200, average family group 3.55 persons), within and surrounded by a large city. It even has its own newspaper, theater group, garden club, credit union and Red Cross, which is busily turning out sweaters and socks.

The Davises are an average Lakeview family. Mr. Davis who works in the shipyard is an active member of the garden club. Mrs. Davis is chairman of the Red Cross Chapter. Bob, age 17, works on the community newspaper; Mary, age 15, belongs to the Girl Scout Unit, and Susie, age 5, attends the daily nursery school. The family has lived in the Terrace since its opening three years ago.

One could go on indefinitely with enthusiastic details of the community since they are just folks—and remarkably nice folks with their favorite citizens and normal community problems.

Joan Blondell, Paramount picture star, smiles with satisfaction as she poses beside a modern gas range

The East Ohio Gas Company which supplies the gas to these homes, was specifically interested in finding out why there was such a wide variation in gas consumption in such standard units as are here provided. Each dwelling unit is provided with an A. G. A.-approved apartment-size range which has four regulation burners, insulated oven with regulator, and a broiler. The ranges are all of one make and style. At the time of the study the ranges had been in use for three years.

Reasons for Variation Sought

We knew that gas consumption in these homes varied from two hundred to fifteen hundred cubic feet per month for cooking only. We wanted to account for this variation. Was it due to economy on the part of the good housekeepers, was it the size of the family, was it due to living off the grocery shelf, or was it due to the ages of the children—babies needing especially prepared foods?

Before going into the actual visiting work, it was difficult to compile an entirely satisfactory set of questions to guide the visitor. After a number of calls, it was thought advisable to change the original list and add to it.

We revised our questions to cover the following points:

1. What types of food are prepared on the top burners?
2. Methods used—boiling, frying, pot roasting, stewing.
3. Is "semi-waterless" cooking used?

4. Is the broiler used—how often—for what?
5. Reasons why broiler is not used.
6. Was the oven used for baking, meal preparation or both?
7. What is baked—bread, cakes, cookies, pies, etc.?
8. Number of adults, number of children and their ages.
9. How many of the family eat at home; are lunches packed?

The method of approach was very informal and friendly. We tried to guard against giving the impression that we were making a survey but rather to give the impression that we were asking them to help us, as well as answering their questions and helping them solve their cooking problems. It is sometimes amazing, even to an experienced visitor, to find how readily cooperative people are. In giving information you desire, they often add many amusing and irrelevant details.

Cooking Honeymoon Lasts

With the advent of a baby, not only the family's sleeping and social habits are changed but, believe it or not, the gas bill takes on a new aspect. If the baby happens to be a "bottle baby" as so many are, he may raise the gas consumption as much as 400 cubic feet per month. When one stops to think of the constant stream of formulae, cooked cereals, bottle sterilization, et cetera, one can readily see why. But by the time Junior achieves his first pearly tooth or learns to maneuver himself on all fours, the hand on the meter dial loses some of its abundant enthusiasm. It returns to normal as Junior reaches his first birthday.

We have all heard the old argument about two living as cheaply as one. But have you ever applied that logic to feeding children? Can you cook for two or three children with the same amount of gas as for one? The amount of food eaten by a child from one to three years of age has no apparent effect on gas consumption. However, when there are two or three in this age group the consumption is increased. Thus the size of the family has a direct relation to the amount of gas consumed. Table I illustrates this point.

Mothers who constantly watch the budget with one eye have learned the economy of keeping the flame no higher than is necessary for required results. They are inclined to feel that their 'teen age daughters who are just learning to cook will eventually learn to curtail the waste of too high a flame or too early lighting of the burner. Such is the wisdom of experience! However, even in those cases where the majority of the meal preparations are being done by the daughters under their mothers' supervision, the increase was not large. One hundred cubic feet per month was the most and that occurred in only four instances.

We also found that in cooking, the honeymoon is apt to last longer than in any other field of housekeeping. It also, apparently, takes the bride without children about four years to learn how to get the most for her food dollar. Only after that length of time does she learn to bake and cook appetizingly the less tender cuts of meat and only then does the couple stay at home for Sunday dinners and entertain to any extent in their own homes.

Of course, there is also the fact that young wives have many social activities which take them out of the home and they form the habit of preparing the more expensive and quickly cooked foods. They are given to frying and to opening cans. Week-ends they may be "visiting Mother and Dad."

Small children make a change in food habits in the home. In order to eliminate unnecessary work the housewife uses her oven more frequently for whole meals, or she turns to slow cooking one dish meals on top of the range. Mothers carefully plan their meals so that all food preparation can be done while the babies are having their afternoon nap. Oven and one dish meals eliminate last-minute confusion and rush. They give, as one customer put it, "a semblance of peace when my hubby arrives."

TABLE 1

CONSUMPTION AND AVERAGE NUMBER OF PERSONS PER MEAL PER DAY

No. Calls	*Monthly Gas Consumption Cu.Ft.*	*Ave. No. Breakfasts Per Day*	*Ave. No. Lunches Per Day*	*Ave. No. Dinners Per Day*	*Total Ave. No. Meals Per Day*
12	300	2.41	1.50	2.41	6.32
58	400	2.63	1.81	2.55	6.99
91	500	2.90	1.96	2.85	7.71
107	600	3.01	2.05	3.01	8.07
89	700	3.36	2.37	3.41	9.14
77	800	3.71	2.84	3.71	10.26
49	900	3.81	2.85	3.81	10.47
24	1000	4.37	3.17	4.37	11.91
10	1100	5.10	3.40	5.10	13.60
5	1200	5.00	4.20	5.00	14.20
5	1300	5.40	3.80	5.40	14.60

Average 2.65 cu.ft. per person per meal.

Broiler Education Necessary

The tremendous educational work on proper cooking methods and their influence on health, which is being carried on by women's magazines, home economics pages in the newspapers, and home service departments, is gradually having an effect on the housewife. However, in the case of the broiler a great deal more effort needs to be put forth. Out of 529 women interviewed only 111 use their broilers once a week or more. Sixty-nine women have never used the broiler except for making toast. A large family, low-income family, or both, automatically curtails the use of the broiler. There are two reasons for this. Broiling, they feel, requires the more expensive cuts of meat and the broiler is not large enough to do the entire cooking in one operation. This group, of necessity, uses cheaper cuts of meat which require long, slow cooking. Cooks who have been forced because of diets to use broiled foods continue to use this method even when it is no longer necessary because they find fried foods are unpalatable.

Other reasons for lack of broiler usage are:

1. "I do not know how to use it." (Many persons did not understand the necessity of the full flame in broiling and failed to open the oven door, thus allowing the regulator to cut down to by-pass, which accounts for the complaint that foods are hard and dry.)

2. "The broiler is too messy to clean." (The familiar cry heard much too often. It is amazing how many did not know that the broiler door dropped and it was possible to remove the broiler pan. A young matron said that her husband loved steaks, but the broiler "smelled so" that she had given up its use. She had been in the apartment a year and never once removed the broiler pan to clean it.)
3. "We have never eaten broiled foods." (This seems incredible but logical when one considers the fact that they are not habitual restaurant diners and that the majority of their homes had been equipped with the older style ranges. "It's so much easier to slap a steak in the skillet, why bother with the broiler?" This remark was a typical one.)
4. "My husband is a queer eater and doesn't like broiled foods." (However, we strongly suspected that this was a wife's excuse to cover up her own shortcomings in using the broiler. There were times when we felt that the women were not perfectly frank but only too human in their desire to make an impression.)

One hundred fifty-seven families use the oven more than any other part of the range. Of this group the average family consists of 3.02 persons with an average gas consumption of 754 cu.ft. per month. These housewives declared it more convenient, time-saving and healthful to use oven cookery. Only one housewife out of every 19 bakes bread for her family. The majority of bread baking is done by the housewife of Polish or Slovak extraction. The German housewife turns to yeast kuchens and quick coffee cakes. There is an even distribution of cake and cookie baking among this entire group.

The oven and top burners share equally in 164 families. Of this group the average family is 3.57 with average consumption of gas 738 cu.ft. per month.

With 209 families, the top burners are the most used part of the range. Included in this group are those who use the oven only once a week or every two weeks (chiefly for roasts) and the broiler only occasionally. The average family in this group is 3.32 and the consumption 608 cu.ft. We found one oven so full of dust that the burner wouldn't light. The housewife explained that she had never opened the oven door since she moved in two years before. Of the group sixty have some type of heavy aluminum cooking ware which was sold to them on the promise of decreasing gas bills. In the few cases where women have actually kept track of their bills prior to using the aluminum utensils and afterwards they have found no difference unless baking was done on the top burners in an aluminum utensil.

TABLE II

DISTRIBUTION OF COOKING ON RANGE

	Families
BROILER:	
Used once or more a week in	111
For toast only in	69
OVEN AND TOP BURNERS:	
Used about equally in	164
OVEN:	
Most used part of range	157
TOP BURNERS:	
Oven used once a week or less	209

The average consumption of all families was 636 cu.ft. per month.

From this table it can be seen that more education is necessary in the advantages of food prepared by modern gas range cookery. This can be done only by constant education. Women with young children are more open to education along this line because of the convenience and ease of oven-food preparation.

There were people who had never used oven heat regulators and a large number who had not known how to use their broilers. The chief misunderstanding in the use of the regulator was the cutting down of the flame. This, while it did not frighten them, did lead them to believe something was wrong so they would turn the regulator up again until the flame reached full height. This procedure continued with resultant burned food. Women expressed appreciation of our service and showed a genuine desire for information on modern methods of cookery as well as instruction on the more complete use of their ranges.

There is a certain amount of moving out of the government projects which will increase with rising incomes. Some families are still going ing to rent, but the large majority are going into homes they are building.

Try This in Your Thanksgiving Window

Last year George M. Sheets, sales supervisor, Iowa City Light and Power Company, hit upon this novel idea for attracting attention and selling the economy of modern gas cookery. A twelve-pound turkey with all the trimmings was cooked in the display window and a contest was held in which people guessed how much it cost to roast it. Guesses ran all the way up to fifty cents. The contest was won by Mrs. E. Y. Sangster who guessed 6½ cents and walked off with the roast turkey as first prize

GAS, PLASTICS AND NATIONAL DEFENSE

Dr. Wakeman pointing to plastics made from gas industry materials—during an address before the Technical Section at the 1940 A. G. A. Convention

By REGINALD L. WAKEMAN*

IT was the 15th of September, 1940. For three months following the cataclysmic collapse of France the tempo of the Battle for Britain had been gradually increasing until, on that day, it reached a climax of 400 Nazi planes attacking London. The dogged R.A.F., in an amazing show of strength, downed forty-three per cent of the invaders and forced the remainder to flee back to their airdromes, "a shattered and disorganized Armada." In an official account of the fighting of that day, a British pilot describing the end of a battle with a Messerschmitt 109 says, "I saw his perspex burst and the enemy aircraft spun down."

Thus, with official blessing, there entered into the British military vocabulary a new word, perspex, meaning airplane windscreen. Whence came this term? It is the trade-name of a British product, equivalent of "Lucite" or "Plexiglas," and its use in this manner, although it may not correspond with customary trade-mark practice, is tacit acknowledgment of the increasingly important rôle that plastics have assumed in modern war-

Numbered among the manifold ways in which the gas industry is contributing to our National Defense Program is the supply of essential raw materials for plastics production. Phenolic resins like "Bakelite," polyamides like "Nylon," and alkyds like "Glyptal" look to light oil and tar acids for their being. Methacrylates such as "Plexiglas," vinyl resins such as "Vinylite," and synthetic rubbers like "Buna" are children of natural gas or refinery gas, while "Neoprene" is born of coke. These are but a few examples. Scarcely one among the purely synthetic resins and not many even among the semi-synthetics are independent of raw materials which the gas industry supplies in part. How then are plastics and through them, gas, aiding National Defense?

Plastics in Armaments

There are two principal ways. Innumerable articles required for the manufacture of modern implements of war are made of them. Likewise of prime importance is their use in non-defense applications where they can be substituted for strategic metals, rubber, and silk vitally needed for armaments. So great is the demand that synthetic resin molding powders, in general, have been placed under priorities. "Koroseal" and those grades of "Vinylite" which contain over 90 per cent of vinyl chloride are also on the mandatory list. Indeed the entire current production of polyvinyl chloride, totalling about 8,000,000 pounds per year, is insufficient to meet the requirements of military needs, such as insulation for electric cables for the Navy.

There are hundreds of applications of synthetic resins and plastics in the equipment of the armed forces of the United States. Aircraft is an excellent example. Most conspicuous are transparent methacrylate and cellulose acetate housings enclosing combat stations, bridge, cockpits, and bombardiers' compartments. The low density of these transparent plastic windshields conserves weight, permitting heavier loads of bombs than would be feasible with laminated glass. Although not bullet-proof, they will not shatter.

High impact molded phenolics and acetates are invaluable in the housings for control devices and navigation instruments. The dielectric properties of both molded and laminated phenolics are utilized at many points in radio transmitting and receiving equipment, direction finders, and ignition systems, while polyvinyl chloride is utilized for insulation in the distribution of electric energy in modern planes such as the B-19 Douglas Super Bomber—of 7750 mile flying range.

Because of their weight-strength ratio, laminated phenolics are fabricated into such vital airplane parts as pulleys, tracks, and fairleads for control cables which pass to every part of the ship. Resin-bonded plywood, both phenolic and urea, is employed in molded and, especially, in flat sections for military aircraft construction. Light weight flooring, control surfaces, and leading edges of wings are standard equipment for many planes. The Glenn L. Martin Co. is equipping some

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Turning, boring and cutting a segment from a large fabric-base laminated tube for use as an electrical insulating coil form (Courtesy of Bakelite Corp.)

of its bombers with phenolic-bonded plywood bomb bay doors, fourteen feet in length and weighing 50 pounds, built of poplar and mahogany. Millions of feet of flat resin-bonded plywood are reported to have gone into the construction of wings, fuselages, bulk heads, gusset plates, and interior surfaces of bombers, pursuit ships, and trainers for both the United States and Great Britain. Resinous adhesives are used in many other places, such as glued joints of ribs and propellers.

Development of the "all-plastic" plane continues. The name is a slight misnomer as applied to resin-bonded plywood which is really constituted of only some 10 to 14 per cent of plastic. Several different ways of making such craft have been much publicized, although so far only a relatively small number of trainers have been successfully built and flown. It is said that the Canadian Government has obtained exclusive rights in that country to the Vidal process.

Synthetic Rubber in Aircraft

Military aircraft also utilize synthetic rubbers in vibration-proof and bullet-proof gas tanks which permit long-range flights and afford protection against loss of fuel by puncture during aerial encounters. The British Ministry of Aircraft Production emphasized the importance of this field last summer by assignment of a rubber expert to study American methods of producing "Thiokol" self-sealing gasoline tanks and oil-proof airplane parts.

Applications of plastics in aircraft are particularly spectacular because of the leading rôle which air power has assumed in modern warfare, but these synthetic products of chemical industry are no less important at a multitude of less conspicuous but vital points in other equipment of both Army and Navy. Phenolics are without equivalent as insulating materials in field and telephonic equipment and in electric control, light, and signal systems of tanks, trucks, submarines, and all other types of craft. Stocks for sub-machine guns are now molded from special phenolic plastics of high impact resistance, replacing selected walnut and facilitating mass production, dictated by the present emergency. Plastics have even found their way into booster tubes and detonation caps for bombs, and fuse well cups.

The differing optical characteristics of methacrylate and cellulose acetate plastics have been judiciously combined in blackout truck lights for convoy duty. Cellulose acetate is molded into eye-pieces for non-combatant and training gas masks, while methacrylate and vinyl resins may also be used for the same purpose. Eye-pieces of service gas masks are made of laminated glass containing a plastic interlayer because of their greater resistance to scratching and dust accumulation. Other gas mask parts such as Y-tubes are likewise molded from plastics.

Army chests, packing cases, field kits, pontoons, and all sorts of furniture for cantonments are made of resin-bonded plywood. Millions of feet of this material have been used in ship construction, especially in motor torpedo boats. As bonding agents for fibrous insulating material, such as glass wool, synthetic resins are utilized in construction of both ships and army barracks.

Protective coatings are of vast importance in preventing corrosion of steel, aluminum, magnesium alloy, and other surfaces in much of the equipment of the Army and Navy. Very large volumes of oil-soluble phenolics and alkyds are employed for this purpose on everything from battleships to bombers.

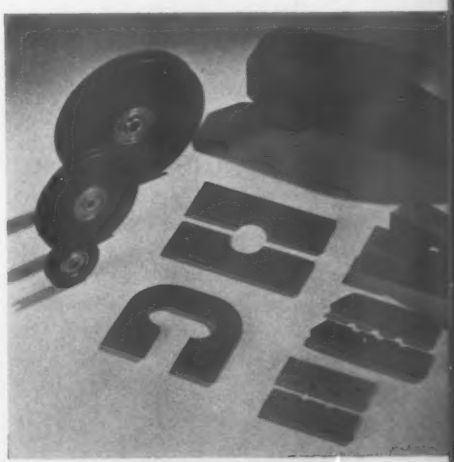
Still other military or semi-military applications of plastics in this country and in England include resin-coated flying suits for high altitude aviators, parachutes of artificial silk, plastic-protected ARP apparel and phenolic laminated helmets, molded luminescent switches for blackout service, and plastic dishes which, formerly outcasts of society in Britain, have lately proved a godsend in *blitzed* areas.

Synthetic rubbers are also of versatile utility in the Army and Navy. Their minimum defense use is estimated at about 14,000,000 pounds per year. "Neoprene" was among the earliest materials placed under mandatory priorities control while other synthetic rubbers were not long in following.

Applications in the Civilian Metal Replacement Program

Second only in importance to their military application is civilian use of plastics in replacing metals essential for defense and in relieving shortages of natural rubber and silk. Utilization of synthetics in this manner has been going on in an exaggerated fashion for several years within the totalitarian powers whose entire autarchial economy, since its inception, has been directed toward the ultimate goal of military conquest and aggrandizement. The superficial success in these countries of an enforced program of replacement of cheap metals and other processed natural materials by relatively expensive synthetic *ersatz* has

Mine Safety Appliance "Skullguards" made of laminated phenolic, fabric base, were first developed for use by miners. Similar hats are now used by firemen, oil well drillers, steel mill operators, and, in England, by ARP wardens (Courtesy of Bakelite Corp.)



Aircraft applications of laminated phenolics include pulleys, various types of fairleads, propeller supports and cabin air controls (Courtesy Bakelite Corp.)

Plastics of various types can replace metals in such articles as fan blades, hair drier hoods, soap dispensers, vacuum cleaner nozzles and business machine housings, pictured above. The gun-stock is also made of plastic, being of German origin (Courtesy General Electric Co., from OEM)

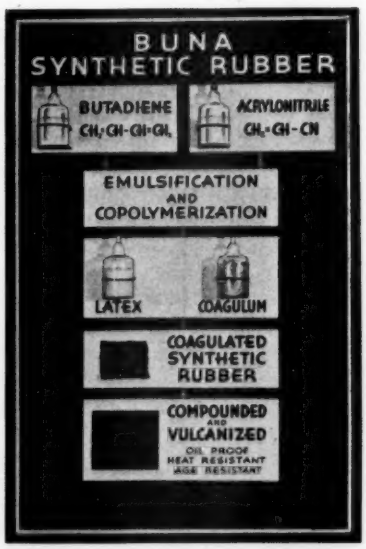
often resulted in emphasizing the rôle which plastics can play as substitutes without due consideration of the false economy, geared to the machines of Mars, upon which much of this substitution rests. The large-scale replacement of metal piping in ordinary plumbing and ventilating installations by "Vinidur" or "Igelit" tubing made from polymers or copolymers of vinyl chloride—product of an elaborate chemical metamorphosis of acetylene—or the replacement of metal gutters by woodwork lined with "Oppanol"—synthetic polymer of olefinic hydrocarbons—may assist in strengthening the military power of the Reich, but it contributes only negatively to its long-range economic life.

Tailor-made for Certain Jobs

In order to justify their permanent existence, synthetic resins must possess certain characteristics or combinations of characteristics not displayed by natural materials. They can then do work which other previously available substances cannot adequately perform. Indeed, as our knowledge of the chemistry and physics of large molecules has increased, synthetics have at times been tailor-made for a given job, witness polyvinyl butyral safety glass interlayer, such as "Vinylite X."

The majority of so-called industrial uses of plastics are functional. Even before the present emergency such applications amounted to some fifty per cent of the total production of the industry, despite the popular notion that plastics are primarily used in making "gadgets." Recent years have brought increased appreciation of the merit of plastics as engineering materials.

Many far-sighted industries are in a particularly fortunate position today because, for several years, they have been carrying on research concerning the use of synthetic resins in their products. Although OPM last February advised manufacturers to substitute plastics for metals wherever possible,



This chart traces the major steps in the production of Buna. Butadiene and acrylonitrile are both derived from either natural gas or refinery gases (Courtesy of Firestone Tire & Rubber Co.)

it is probable that the majority of recent applications of this kind have thus far been made primarily by companies whose past research was already near fruition.

Plastic washing machine agitators, for example, are a current innovation rooted in practical development which began fifteen years ago. This striking conservation of aluminum in a household appliance represents a triumph for the plastics manufacturer, the phenolic materials employed being amply resistant to withstand the severe service conditions encountered.

Laminated refrigerator door panels, combining the advantages of both phenolics and ureas and, more recently, melamines, are now well-known. They have proved to be the harbingers of plastic sealing frames, defrosting drip trays, and freezing compartment doors which, formerly of aluminum, have made their debut this year in polystyrene and methacrylate. It has been estimated that plastics will be variously used in thirty-nine refrigerator parts by different manufacturers next year.

Plastics Replace Metals

Plastics have already been extensively utilized in the interior finishings of automobiles. Much has been said of the all-plastic car. Recent announcements by the Ford Motor Company indicate continuous progress in this direction, with the goal possibly in sight.

Plastics can replace metals at many other points in non-defense applications—in collapsible tubes, for example, which have been subjected to OPM orders requiring drastic curtailment of tin and aluminum going into their production.

The present shortage of many of the more important classes of synthetic resins, is, however, exercising a restraining influence upon their wholesale adoption. Although disconcerting, this situation may be a blessing in disguise, for it is certain that many improper or borderline applications would otherwise be adopted without trial, resulting in failures that would take years to live down.

The actual volume of plastics molded in America is less than one per cent of the production of iron and steel, not to mention the aggregate of our other metals and alloys, such as

Large polystyrene stanchion used to support radio and antenna mast for fast cannon-carrying fighter planes being made in this country for the R.A.F. These stanchions are subject to extreme and rapid temperature changes and must withstand terrific stresses. (Courtesy of Plastic Division, Erie Resistor Corp.)

copper, zinc, brass, and aluminum. Therein lies one of the reasons for the present shortage. An industry already suffering from growing pains, placed under heavy military demands by the defense effort, could hardly be expected to fill, immediately, all of the added requirements of a metal replacement program. There is little cause for wonder that a jam has occurred! New plants, however, are going up throughout the country—for "Resinox" in Massachusetts, "Koroseal" in Kentucky, "Plexiglas" in California, "Buna N" and "Butyl Rubber" in Louisiana. These are only a few of this year's crop of factories now operating or under construction.

But the shortage lies not only in the synthetic resins themselves. Many of their intermediates are at a premium. Most acute of all has been the formaldehyde situation. For several months there has been a shortage of this chemical, one of the essential intermediates in the synthesis of phenolic, urea, and melamine resins sold under such tradenames as "Bakelite," "Plaskon," and "Melmac," respectively. Indeed, on August 23 there went into effect an allocation program, promulgated by OPACS, sharply restricting civilian use of synthetic resins and plastics made directly or indirectly from formaldehyde. Senior class A preference is directed for applications essential to the public welfare, such as public and industrial light, heat, power, and water equipment, transportation equipment, fire-fighting and farm implements, oil well and marine applications, and grinding wheels. Automotive uses in passenger cars, radio cabinets, and household appliances are of secondary preference, while class C includes items deemed non-essential to civilian welfare during the present emergency, for which no preference is provided. Such articles, including advertising premiums, "juke boxes," novelties, and toys, must be curtailed.

Raw Materials from the Gas Industry

It has been shown that the gas industry plays an important part in supplying raw materials utilized in plastics manufacture. It can render valuable service in helping to relieve the present situation. Consider formaldehyde. Most of our supply is obtained by oxidation of methanol—synthetic wood alcohol—which, in turn, comes from water gas. Hydrogen and carbon monoxide, components of water gas derived from either coke or natural gas by reaction with steam, are catalytically converted to methanol in high pressure equipment which is not only suitable for this reaction, but which can likewise be used to fix atmospheric nitrogen—a process of utmost importance for the manufacture of munitions. Hence, a portion of the domestic methanol equipment has been transferred to this use (a situation which may be remedied to some extent when synthetic ammonia plants now under construction come in). As a consequence, during the early part of 1941 methanol production lagged behind that of 1940 and this decline was reflected in formaldehyde, one of its principal derivatives. Even had production equalled that of last year, it would hardly have been sufficient for normal demands, because there has lately been a rapid increase in our yearly consumption, as shown by figures for domestic production of the synthetic grade.

Synthetic Methanol Production

Year	*Production*
1934	12,534,000 gals.
1935	18,047,000
1936	25,563,000
1937	31,814,000
1938	26,031,000
1939	34,256,000
1940	45,968,000

(During the same period crude methanol averaged about 4,500,000 gals. per year.)

Formaldehyde production from natural gas by direct oxidation might well help to alleviate its present tight condition. This operation is reported to be economically successful in the hands of an important Mid-Continent oil and gas firm and the product has already found its way in substantial volume into phenolic resins.

Research Leads the Way

Help may also come from another quarter. Manufacturers have embarked upon programs of research to find new kinds of thermosetting plastics made, not with formaldehyde, but with other chemicals available in abundant supply from all-American sources. Given the wealth and variety of chemical species present in its many products, the gas industry should assume its share of responsibility—and profits—in the preparation and commercial production of plastics which will render unnecessary the use of materials now under priorities or likely to be restricted in the future.

Phenol and the cresols are likewise

A display of articles made from methacrylate resin showing the versatility of this material (Courtesy of Röhm and Haas Co.)

tight. They are obviously necessary for the manufacture of phenolic resins. Phenol is probably one of the basic materials employed in the synthesis of "Nylon," as well. The shortage of these chemicals has resulted not only because of their increased use in plastics, but also on account of their importance in explosives and, in the case of cresylic acids, because of decreased imports and lowered cresol and xylol content of tar produced this year in by-product plants operating primarily to make coke for the steel industry and, in so doing, using higher temperatures and shorter coking times than before. With the production of synthetic phenol from benzene by three different processes well established, its supply can be more readily expanded to meet increased demand than can that of the cresols. In both cases, however, the gas industry should find a good market and perform a patriotic duty by recovering as large a portion of its tar acids as possible.

Benzene and naphthalene, also included among the by-products of the manufactured gas industry, are raw materials for maleic and phthalic anhydrides, essential intermediates for alkyd resins used in enormous quantities in the formulation of protective coatings. Phthalic anhydride, particularly, is scarce, rumor having it that large volumes of one of its derivatives, dibutyl phthalate, are going into explosives. Chemical plants have always had difficulty in meeting demands for phthalic anhydride, as can be judged from the fact that its production jumped from fourteen million pounds in 1933 to over forty-four million pounds in 1940. It is expected that manufacturing facilities will be increased again and the present difficult situation may therefore improve. As to raw materials, potential benzene and, especially, naphthalene recovery in this country has always been far in excess of that actually practiced.

The gas industry, in both its manufactured and natural branches, should play an increasingly important part in supplying larger quantities of raw materials and intermediates required for the synthesis not only of phenolics, polyamides, ureas, melamines, and alkyds, but also of almost all other plastics. Benzene and ethylene transformed to polystyrene, ethylene converted to polymers of vinyl and vinylidene chlorides or to ethyl cellulose and "Thiokol," propylene changed into acetone and thence to methacrylates, cellulose acetate, and cellulose acetobutyrate, butylenes cracked and polymerized to synthetic rubbers, acetylene transmuted into numerous vinyl plastics—these production reactions are but a few of the chemical metamorphoses which lead from gas to modern plastics, indispensable in defense, vital in the Battle of Production!

A.G.A. Takes Steps to Insure Oil Supply for Gas Companies

THE American Gas Association has been maintaining active contact with the proper government officials to insure that manufactured gas companies will be insured an adequate supply of oil during the emergency. The Association's representatives have been cordially received and it is believed that the gas industry's problems and needs, as well as its essential place from the standpoint of national defense and public welfare, are understood, and the prospect of the industry being fully supplied appears definitely favorable.

There have been the following recent developments, since the original presentation of the matter in Washington by President Strickler:*

The Petroleum Coordinator for National Defense requested the American Gas Association to furnish him with a list of gas companies operating in the eastern seaboard states, together with estimates of the quantities and grades of oil required by each during each month for the twelve months ending June 30, 1942. Questionnaires intended to secure this information have gone out from Headquarters, and replies came in quickly.

Also at their request the Association prepared statements showing actual use of oil by the various companies in the affected area for the year 1940, and since prompt action seemed important, also furnished estimated quantities needed each month in each state for the twelve months from July 1, 1941 to June 30, 1942.

These data were presented personally on August 25 to Dr. John W. Frey, Director of the Petroleum Marketing Committee.

During the interview Dr. Frey expressed his belief that the country would be able to come through this emergency without serious disruption in fuel oil use. As evidence of this he pointed out that no priorities on oil have been established; and that even the householder with the oil conversion burner has not been asked to go back to coal. The most critical period is likely to be late in 1942. However, Dr. Frey feels that essential industries will be fully supplied, and that the gas industry is definitely essential.

Dr. Frey specifically urged that

(1) Gas companies carefully avoid any panic or anything which might lead the public to become panicky.
(2) Gas companies continue to operate as heretofore, using the same general grades of oil. (Any saving in oil through the substitution of solid fuel or tar as boiler fuel will of course be welcome.)

Oil Situation Summarized

An article in the September issue of the *American Gas Journal* which summarizes the oil situation, points out that the gas companies on the eastern seaboard used a total of 565,272,000 gallons of oil during 1940 divided as follows: water gas production—445,368,000 gallons of heavy oil, 96,585,000 gallons of light oil; coal gas retorts—97,000 gallons; boiler fuel—23,222,000 gallons. This represents a small proportion of the total consumption of fuel oil.

The American Gas Association is continuing in active touch with the situation and will advise its membership of any important change. Meanwhile it is suggested that

(1) Each company receiving oil by rail consult the railroad company to make sure that no serious local delays due to congestion are to be expected during the coming winter. It is assumed of course that gas companies are maintaining close contact with the supplying oil companies.
(2) If you have or are threatened with difficulty in securing oil deliveries, notify A. G. A. Headquarters. The Association's representatives are in direct contact with the proper authorities, and can get prompt and effective consideration and action.

It is evident from contact with representatives of the government that the oil burner industry is fearful lest the gas industry take from it a substantial part of its business during this period of threatened oil shortage, and supply such business with gas made in part from oil allotted to us on the ground that we are essential.

It is probable that a substantial part of any business so obtained would be of a temporary nature. The Association's information letter of August 14 to member companies deals with the questionable desirability of such business from this standpoint.

* See A.G.A. MONTHLY, July-August, page 244.

Hot Water and Health... *The Application of Pasteur's Principles to Eating Utensils**

PART III

By G. M. Rohde, Jr.

Ruud Manufacturing Company, Pittsburgh, Pa.

THE American people know that the 1941 automobile goes more miles per gallon, costs half as much, and goes twice as fast as the 1931 model, but the same people fail to realize that the automatic gas water heater has kept pace with the automobile industry and today is a more efficient appliance that costs a whale of a lot less to buy and to use and gives better service.

Our industry, instead of selling correct hot water service, has been guilty of passing by this important issue and attempting to sell low gas bills at the sacrifice of correct service. We kept away from correct temperatures because in our attempt to sell cheap merchandise we had to pamper the tank life. Those cheap heaters did not stand pasteurizing temperatures very long. In a survey I conducted in 40 homes the average temperature at the faucet was 110° F. and in everyone of these cases the customer was required, in order to get scalding water, to heat it on a gas range that has a much lower thermal efficiency than the automatic gas water heater.

High Temperatures Mean Savings

The truth of the matter is that high temperatures mean savings in more ways than one, because with high temperatures smaller tanks can be used. The best way to illustrate it is this: One cubic foot of manufactured gas, natural gas, and propane gas are all equal in size, but what a difference in performance. One cubic foot of propane gas will do the work of 5 cubic feet of ordinary manufactured gas and yet they both go through the meter in cubic feet. Another example is a pound of dry ice and a pound of natural ice, both weighing 16 oz. but what a difference in performance.

At this time I want to revive the old term of "thermal gallon." A thermal gallon is 1 gallon of water raised 100° F. Using 40° F. inlet water as cold water and 140° F. outlet water, we find that to accomplish this requires 100° rise in water. A gallon of water thus heated would be equal to 1 thermal gallon. A 20-gallon heater heating water from 40° F. to 140° F. could be described as containing 20 thermal gallons. If the water, however, was raised from 40° to 180°, which is 140° rise, everyone of those gallons would be equal to 1.4 thermal gallons. Thus a 15-gallon heater heating water from 40° to 180° would contain 15 x 1.4 or 21 thermal gallons. Such a heater, even though it be smaller in size, would out-perform the 20-gallon heater carrying water at 140° F. Using a smaller heater, a much better quality could be purchased in the 15-gallon size than could be in the 20-gallon for the same amount of money. This would result in longer life, consequently better customer satisfaction.

A. G. A. Project Cited

This is economy in more ways than one because, contrary to public opinion, high temperatures reduce gas bills rather than increase gas bills. The American Gas Association in Industrial Series Water Heating, page 41, Chart No. 11, shows a reduction in gas for heating water when temperature was raised from 120° to 170° of approximately 27.7%. In the newest book published by the American Gas Association, "Fundamentals of Domestic Gas Water Heating," Bulletin No. 9: "Compensating factors tending to offset increased heat losses during standby produced by higher stored water temperatures are the increased heat content of the water available and the apparent tendency of increasing water temperature at the fixtures to discourage wasteful usage." It is from the economy standpoint that leading hotels throughout the country use scalding temperatures.

The American Gas Association in Bulletin No. 9, Page 144, says, "However, a complete analysis of the problem indicates that an entirely separate field exists for increasing service efficiencies other than improvement of thermal efficiency or standby loss characteristics of heaters. That field is the more accurate sizing of automatic storage heaters to fit given service requirements.

Heater Efficiencies

Unquestionably, many such heaters are installed and producing hot water at over-all heater efficiencies of less than 40%, neglecting piping losses and gradual reduction in heater efficiency over a period of time due to liming, etc. The same service in most instances could be delivered with over-all heater efficiencies well above 50% by storage water heaters having the same thermal efficiency and standby loss characteristics but smaller capacities. Such a difference, if it can be widely effected, would probably accomplish more in the general improvement of economy of gas hot water service than could any reasonable advance in thermal efficiency or standby loss characteristics over contemporary levels.

Tests by laboratories of national importance show that by using smaller heaters with higher temperatures, economies in gas consumption of 33½% can be experienced, using 40 gallons of water per day. These savings at even the cheapest gas rate in America, when applied on F.H.A. loan on new homes, will finance almost a $100 difference in price. An article that I have

* This is the third in a series of three articles on "Hot Water and Health" by Mr. Rohde. Preceding articles in the series appeared in the July-August and September issues of the MONTHLY.

which was taken from the October issue of *American Builder* shows that it pays to buy the best water heater for new homes because the saving to the home owner may result in a fuel saving of from $1.00 to $5.00 per month. If every home builder knows the fact that he could enjoy the finest water heater and the savings in gas would more than pay the additional monthly F.H.A. cost there would not be a builder in America who could get away with installing cheap water heaters.

For the practical man who likes to be shown, we have a story of profit and economy that will convince even the most skeptical buyer, because it is based upon facts and backed up by the highest authorities in the land.

Comfort and Convenience

The Niagara Hudson Power Company in conjunction with *Architectural Forum* and *Woman's Home Companion* made an extensive survey throughout its territory asking everyone to name the home appliance that he regarded as number one for convenience. Believe it or not, 43% placed automatic hot water service first. It was ahead of mechanical refrigeration and ahead of oven heat controlled cooking.

Performance

People buy vacuum cleaners that cost more than brooms because they perform better. Washing machines cost more to buy and operate than a wash board and tub, but they perform better. I.E.S. lights with 300 watt bulbs cost a whole lot more to operate than the old 50 watt bulb in floor lamps, but it performs better.

Cleaning is a big job. In the average home per year someone has to

1. Wash an acre of dirty dishes
2. Launder 3 miles of clothes
3. Scrub 5 miles of floor
4. Wash a mile of glass
5. Shave 36,000 square inches of face

Hot water in the pasteurizing zone performs this cleaning job from 2 to 20 times faster than cold water.

Pride

The family that owns a gas water heater has something to be proud of. This kind of hot water promotes cleanliness because it is always clean itself. Parents are proud of their children when they are clean, and children are proud of their parents and home when cleanliness reigns. Cleanliness creates self confidence, which is one of the finest assets a person can have. Cleanliness, said John Wesley, is next to Godliness, and Wedgewood said, "Yes, and sometimes it is next to impossible."

Style and Appearance

Bathroom fixtures and kitchen equipment are purchased because they have modern style and appearance. You wouldn't be proud of your water heater if you and your friends were able to see it every time you opened the hot water faucet. Since kitchens have gone modern, a beautiful new gas water heater with white porcelite finish and chrome trim in a compact form will improve the appearance and be in keeping with all of the other appliances in a modern kitchen.

The water heating business is fast approaching big business. On a meter basis, gas water heating is rapidly approaching the volume of refrigeration. In addition, most homes now enjoy modern refrigerators and a modern range, and the next logical step is an automatic gas water heater.

Gas Men Face Cave-in Emergency with Skill and Daring

C. S. Goldsmith

FACED with a critical situation on the night of August 26 when three gas mains broke following a cave-in brought about by a severe rainstorm, the employees of The Brooklyn Union Gas Company responded with remarkable efficiency and dispatch. Not only was the regular emergency force on the job but volunteers unaccustomed to such work gave enthusiastic help which earned them the thanks of President Clifford E. Paige and the community.

The following account of the accident was given in the company's magazine by Clarence S. Goldsmith, assistant engineer of distribution in charge of mains and services:

"On Tuesday night about 8 o'clock, during a severe rainstorm, a section of Pitkin Avenue at the intersection of Autumn Avenue caved in—probably as the result of rainwater undermining the shoring of a subway construction job. Portions of the heavy plank decking on Autumn Avenue collapsed, producing a huge crater. Water mains and sewers broke, flooding the crater with water. Three gas mains broke, permitting gas to escape at the rate of 1,000,000 cubic feet an hour.

"Telephone and power lines collapsed, adding new hazards. In the midst of all this disorder, the gas caught fire. The gas poured from a 24-inch high-pressure main, from a 20-inch by-pass connected to the 24-inch main, from both ends of a 12-inch low-pressure main, and from both ends of a 6-inch low-pressure main.

"The resulting emergency probably was the equal of any which Londoners have been called upon to face in recent months. It demanded the immediate and efficient mobilizing of the forces of all utilities, including Brooklyn Union.

"The first task of this company's forces was to stop the flow of gas. This was done by closing the nearest valves on the high-pressure mains and by bagging and capping the low-pressure mains. Before the bagging and capping operations could be performed, excavations had to be dug at points some distance from the crater, because of the intense heat generated by the burning gas.

"The speed with which this job was done amazed even those who know, from past experience, that gas men "always come through." Despite the enormous difficulties —which were complicated by the fact that telephone service was disrupted for several blocks around—the flow of gas was quickly stopped, except for a small amount which continued to leak past a valve in the 24-inch main.

"The second task for Brooklyn Union men was to restore service to the 165 customers whose meters had been shut off. The dispatch with which this job was done is best revealed by the statement that service was restored within 24 hours to all except five customers. (In these five cases, the premises were locked, and the customers appeared to be out of town.)

"Much of the credit for noteworthy performance of Brooklyn Union in this emergency situation is due to the many employees who, on learning that a gas main had broken, hurried to the scene and volunteered their services, offering to do whatever work was needed.

"The volunteers included not only members of the Distribution Department, but also many from other departments, some of whom normally work at desks and are unaccustomed to physical work. All pitched in and performed the tasks to which they were assigned with courage and energy."

Personal AND OTHERWISE

R. E. Ramsay Heads New Haven Gas as H. R. Sterrett Retires

H. R. Sterrett

HAROLD R. STERRETT, president and a director of the New Haven Gas Light Co. and a vice-president of the Connecticut Gas and Coke Securities Co., has retired from active business because of ill health. He will be succeeded Oct. 1 by Robert E. Ramsay, of Philadelphia.

Mr. Sterrett was graduated from the University of Pennsylvania in 1911 and immediately entered the employ of the Philadelphia Gas Works Co., a subsidiary of the United Gas Improvement Co. He also held executive positions with the Counties Gas and Electric Co., Ardmore, Pa., and the Des Moines Gas Co., Des Moines, Iowa, before coming to New Haven.

Robert E. Ramsay

He went to New Haven in 1929 and has always taken a prominent part in business and civic affairs of the city. He has held many responsible positions in associations identified with the gas industry, having served as president of the New England Gas Association and as president of the Mid West Gas Association.

He is a member of the American Gas Association, New England Gas Association, Guild of Gas Managers, the Society of Gas Lighting, Connecticut Gas Lighting Association, the Connecticut Society of Civil Engineering, the Connecticut Chamber of Commerce, director New Haven Chamber of Commerce, trustee of the Connecticut Savings Bank, director of the Hartford Gas Co., director of the Y.M.C.A., and a member of the Quinnipiack, Graduate, New Haven Country and Rotary clubs.

Mr. Ramsay, who succeeds Mr. Sterrett, will bring to New Haven almost 32 years' experience in the operation and management of gas properties, having been associated with the United Gas Improvement Co. and many of its operating companies since 1910.

The operations of the New Haven company are not new to Mr. Ramsay as he has been active in a consulting capacity in New Haven since 1927.

Born in Philadelphia in 1890, he studied engineering at Drexel Institute, and business administration at Temple University, before becoming associated with the Philadelphia Gas Works Co. in 1910. In 1912, he moved to South Bend, Ind., as industrial engineer for the Northern Indiana Gas and Electric Co. Following this he was actively interested in the operation and management of gas properties in New York, New Hampshire, Vermont, Pennsylvania, Georgia, Florida, and in many other cities in states principally in the eastern part of the country.

Since 1917 Mr. Ramsay has been located in Philadelphia, actively advising and consulting in the operation of gas properties in many states in the East.

For many years Mr. Ramsay has been an active figure in national gas industry affairs through his active participation on many committees of the American Gas Association. These have included the important rate structure committee and committees of the residential and industrial sections of the Association. At present he heads the national committee which is responsible for the development of American standard requirements for installation of gas burning equipment in power boilers.

Hirose Gets New McCall Post

ARTHUR P. HIROSE has been appointed director of promotion of McCall Corporation, publishers of *McCall's, Redbook, Blue Book* and other magazines, succeeding Don Parsons, who has resigned to become vice-president of Federal Advertising Agency, Inc. Mr. Hirose has been director of market research for the McCall organization and will retain that position in addition to his new duties.

Patterson Promoted to Secretary-Treasurer

F. H. Patterson

FREDERICK H. PATTERSON has been elected secretary-treasurer of the Rochester Gas and Electric Corp., Rochester, N. Y. Mr. Patterson has served as secretary of the company for the last nine years and now assumes the additional duties of treasurer, following the sudden death of John F. Clark, who had filled the latter office since 1939.

Mr. Patterson is a veteran of more than thirty years' service with the Rochester company. He entered its employ as an accountant on January 1, 1911 and moved up through various posts in the financial and accounting departments. Mr. Patterson began his utility career with the Niagara Falls Gas Company in 1905 and was auditor of the Buffalo, Lockport and Rochester Railway from 1908 to 1911. He is a past chairman of the A. G. A. Accounting Section.

Other changes in the list of officers made by the R. G. & E. Board of Directors last month were the elevation of Harold W. Nichols from the post of auditor to the position of assistant treasurer and auditor. Paul J. W. Miller of the auditing department was promoted to the office of assistant secretary.

Association Pays Tribute to Floyd Parsons

THE Executive Board of the American Gas Association at its meeting in New York September 17 unanimously passed a resolution recognizing the great contribution of Floyd Parsons to the gas industry and expressing profound sorrow at his passing in New York City on August 7. The resolution read in part:

"Floyd Parsons had many fine and gracious qualities enriched by a unique combination of genuine enthusiasm, perseverance, and an unusual capacity for making friends. He was endowed with an undying faith in the industry to which he dedicated his life. . . . .

"It was his constant effort to advance and improve conditions in the industry for which he labored so long. He made a contribution to the broader problems of living, and his forward thinking involved broad policies of research and better ways of doing things for the nation and for the world.

"His loss will be keenly felt by the Association, its directors and officers, because he had a sympathetic and ready response to their problems and was always eager to help in its forward movement. In his passing, the gas industry has lost a notable exponent and his friends, who were legion, have lost a loyal, inspiring and devoted companion."

AFFILIATED ASSOCIATION *Activities*

Pacific Coast Gas Association Holds Forty-Eighth Annual Convention

R. S. Fuller

ON September 10, 11 and 12 the Pacific Coast Gas Association held its Forty-eighth Annual Convention at Hotel Del Monte in Del Monte, California. The program was designed to bring to the Pacific Coast gas industry all available information on the pressing problems of the moment.

The effect of the defense program on gas companies and gas appliance manufacturers was discussed from different viewpoints by W. G. Vincent, vice-president of Pacific Gas and Electric Company; Geo. E. Frazer, counsel for the Association of Gas Appliance and Equipment Manufacturers; Andrew Kerr, California district manager for O.P.M., and Robert A. Hornby, president of the Association.

The question of California gas supply and utilization in the face of tremendous demands now being made for the defense industry was presented by Roy A. Wehe, gas and electric engineer for the California Railroad Commission.

Economic Effect of War Discussed

The economic effect of the war in the defense program was discussed by Dr. W. W. Cumberland, economist for Wellington and Company, New York.

The conception, finance and operation of The Institute of Gas Technology was presented in detail by F. H. Lerch, Jr., president of Gas Companies, Inc., Herman Russell, president of Rochester Gas and Electric Corporation, and F. M. Banks, vice-president of Southern California Gas Company.

President Hornby expressed regret to all present for the unavoidable absence of President Strickler, of American Gas Association, whose address was read by A. F. Bridge, of Los Angeles, a director of that organization.

New officers elected were as follows.

President—R. S. Fuller, Pacific Gas and Electric Co.

Vice-President—F. M. Banks, Southern California Gas Co.

Treasurer—D. G. Martin, Pacific Gas and Electric Co.

Directors—O. R. Doerr, Pacific Gas and Electric Co.; D. H. Perkins, San Diego Gas & Electric Co.; F. A. Hough, Southern California Gas Co.; C. O. Menig, Pacific Gas Radiator Co.

Manufacturers' Section

General Chairman—C. O. Menig, Pacific Radiator Co.

General Vice-Chairman—A. F. Rice, Occidental Stove Co.

Heating Division

Chairman—W. H. Johnston, Frazer & Johnston Co.

Vice-Chairman—L. E. McIlveen, Unimatic Heating Systems.

Accessories Division

Chairman—E. T. Howard, General Controls Co.

Vice-Chairman—J. J. Delaney, Reliance Regulator Corporation.

Range Division

Chairman—Roy Ohnimus, Hammer-Bray Co.

Vice-Chairman—W. M. Couzens, Gaffers & Sattler.

Water Heater Division

Chairman—E. S. Hoyt, Jr., Hoyt Heater Co.

Vice-Chairman—G. M. McGaughey, Rheem Manufacturing Co.

Miller Wins Day Medal

At the banquet, which closed the Convention, President Hornby announced that the Board of Directors had awarded the Addison B. Day Medal of Honor to C. O. G. Miller, chairman of the board of directors of Pacific Lighting Corporation. In announcing the award President Hornby said, in part:

"Whenever men gather together in joint enterprise, whether in business, in industry, or in politics, one requirement for success is leadership. There must be a leader. . . . . It is altogether fitting that at this meeting the Pacific Coast Gas Association should honor one of the greatest of these leaders and confer on him the highest award at our command—the Addison B. Day Medal of Honor.

"One of the pioneers in both the gas and electric industries on the Pacific Coast—one of the founders and a Past President of our Association—a man who through his courage, understanding, personality and sound ability has been a leader not only of our industry but one of the builders of the entire industrial development in this empire west of the Sierras—C. O. G. Miller, now chairman of the board of Pacific Lighting Corporation.

"Illness prevents Mr. Miller being present with us tonight so I am asking LeRoy M. Edwards, vice-president and general manager of the Pacific Lighting Corporation, to take charge of this medal in Mr. Miller's behalf and transmit it to him as evidence of our appreciation of his contribution to the industry."

Other awards were as follows:

A Gold Medal was awarded to Elting Henderson for his paper entitled "Combustible Gas Mixtures in Pipe Lines."

Honorable Mention to the paper by P. E. Peckman, J. J. Pugh and E. C. Arnedt, all of Pacific Gas and Electric Company, entitled "Forecasting Winter-day Load in a Natural Gas Territory." This paper carries the exceptional recommendation that it be given consideration in the future for a Gold Medal citation as experience of its value may accrue.

A Committee Award was given to the Committee headed by O. R. Doerr, of Pacific Gas and Electric Company, which committee has prepared a training course for utility and dealer salesmen.

The Basford Trophy awarded each year to the section judged to have best fulfilled its function went to the Sales and Advertising Section—O. R. Doerr, Chairman.

One popular feature of the convention was the second annual edition of the Manufacturers' Section Hi-Jinks. This year the manufacturers put on a burlesque of the popular radio program "Truth or Consequences"—the victims being the sales managers of several of the Pacific Coast gas companies. Needless to say no one was permitted to answer his question correctly and all took the consequences.

Attendance at the convention was 560, and all gas companies and appliance manufacturers in the west were represented.

Maryland Utilities Association

TWO hundred and sixty persons attended the mid-year meeting of the Maryland Utilities Association held Sept. 5 and 6 at the George Washington Hotel, Ocean City, Maryland.

A combined meeting of the Transportation, Gas and Electric groups was held Saturday morning, Sept. 6, at which national defense, chemical and other utility subjects were discussed by outstanding speakers. Saturday evening an informal banquet was held followed by an address by Dr. John L. Davis. Friday evening and Saturday afternoon were devoted largely to swimming and fishing parties.

Mid-West Gas Association

THE twenty-first annual gas school and conference, sponsored by the Mid-West Gas Association and the Engineering Extension Service of Iowa State College, was held at Ames, Iowa, September 8-9-10. It was a most instructive conference and was attended by the largest number ever registered for this event—reaching over the three hundred mark.

At a meeting of the Executive Council held during the conference, it was decided to hold the thirty-seventh annual convention of this association at Sioux City, Iowa, April 13-14-15.

Plumbing and Heating Bureau to Meet

THE annual meeting of the Plumbing and Heating Industries Bureau will be held Thursday evening, October 30, at the Palmer House, Chicago. All members of the American Gas Association have been invited to attend this meeting which will be devoted to plumbing and heating problems related to the national defense program.

Officers of the Bureau are: president, George H. Dickerson, vice-president, the Mehring-Hanson Co., Chicago; vice-president, H. O. Nelson, president, Nelson Co., Detroit; treasurer, Frank B. Hackett, The Brunswick-Balke-Collender Co., Chicago; and secretary, Norman J. Radder, Chicago.

Veteran Advertising Man Is Dead

E. Frank Gardiner

E. F. GARDINER, veteran Chicago newspaper and advertising man, died September 4. Mr. Gardiner had been in ill health for the past two years. He was 54 years of age.

Starting his newspaper career in Kankakee, Mr. Gardiner later became a reporter for the *Chicago Evening Post* and was subsequently on the editorial staffs of the *Chicago Tribune* and *Chicago Herald*. During the World War, he was with the foreign cable service of the United States Committee on Public Information.

For several years after the war, Mr. Gardiner was in charge of publicity and advertising for the Midland United Company and he became advertising manager of Commonwealth Edison Company in 1935, resigning in 1939. He was prominent in the activities of the Public Utilities Advertising Association of which he was president for two years and American Gas Association. He was a past chairman of the A. G. A. Publicity and Advertising Section and a former member of the Association's Advisory Council.

Manufacturers Hear Government Speakers

THE gas appliance and equipment industry keyed to the increasing importance of the industry in the National Defense program, reviewed its progress at a general meeting of the Association of Gas Appliance and Equipment Manufacturers, Wednesday, September 17, at the Waldorf Astoria Hotel in New York City.

Three prominent government officials—two from the Office of Production Management and one from the United States Department of Labor—presented to the 200 manufacturers and guests assembled at the luncheon meeting, an explanation of workings of various government agencies and bureaus in the defense program. The speakers included: W. O. Crabtree, district manager, Division of Public Contracts, O.P.M.; Phillip M. McCullough, Eastern Area Coordinator of the Priorities Division, O.P.M.; and L. Metcalfe Walling, administrator, Public Contracts Act, U. S. Department of Labor.

Watson E. Derwent, president of the Association, introduced the speakers. Mr. Crabtree, the first speaker on the program, outlined the government's effort to speed the subcontracting of defense orders, and reported that despite handicaps, tremendous progress has been made.

W. O. Crabtree, O.P.M. priorities' expert, speaking at the A.G.A.E.M. luncheon meeting. Also in the picture are, left to right: Phillip M. McCullough, O.P.M., W. E. Derwent, president, A.G.A.E.M., and L. Metcalfe Walling, U. S. Dept. of Labor

Phillip M. McCullough, the following speaker, listed the responsibilities of a contractor working under priorities.

Mr. Walling spoke in some detail about the procedure to be followed in connection with the wage determination in following the provisions of the Walsh-Healy Act. He emphasized that it was the policy of his office always to confer with representative members of management and labor to have their counsel from the start so that they would be able to participate in all the proceedings and share in the final result.

At a membership meeting following the luncheon, George E. Frazer, counsel for the association, discussed the effects on the industry of the defense program. Mr. Frazer reported that the gas appliance industry has not yet been officially ordered to curtail production by the O.P.M. but that manufacturers are finding it increasingly difficult to get raw materials and that the industry expects soon some form of curtailment.

CONVENTION CALENDAR

OCTOBER

Oct.	6-10	**National Safety Congress and Exposition** Stevens Hotel, Chicago, Ill.
	12-15	**American Society of Mechanical Engineers** Louisville, Ky.
	20-22	**AMERICAN GAS ASSOCIATION, ANNUAL MEETING** Atlantic City, N. J.
*week of	20	**National Metal Congress & Exposition** Municipal Auditorium, Philadelphia, Pa.
	22-23	**American Management Association** Pennsylvania Hotel, New York, N. Y.
	30	**Plumbing and Heating Industries Bureau** Palmer House, Chicago.

* A. G. A. Combined Industrial Gas Exhibit.

NOVEMBER

Nov.	13-14	**Mid-Southeastern Gas Association** Sir Walter Raleigh Hotel, Raleigh, N. C.

DECEMBER

Dec.	1-2	**National Industrial Council** Waldorf Astoria Hotel, New York, N. Y.
	1-5	**American Society of Mechanical Engineers** New York, N. Y.

1942

FEBRUARY

Feb.		**Southern Gas Association** Atlanta, Ga.

APRIL

Apr.	13-15	**Mid-West Gas Association** Sioux City, Ia.
	19-21	**Gas Meters Association of Florida-Georgia** Savannah, Ga.
	27-30	**U. S. Chamber of Commerce** Washington, D. C.

Accounting SECTION

E. N. KELLER, *Chairman*
LYMAN L. DYER, *Vice-Chairman*
O. W. BREWER, *Secretary*

TAKE A DOSE OF INFORMATION

from the Accounting Section at the October Annual Meeting

ALL THE WALLOP of three-day sessions will be PACKED INTO TWO DAYS

October 20th — October 21st

Potent *Pleasant* *Productive* *Program*

If ever there was a time when accountants—in fact all gas men—should know how to obtain the maximum results with minimum effort, it is now. "Simplify Procedure—Increase Production," is the demand of the day. Come to the ANNUAL MEETING and learn how to do more with less. How does our National Defense Program affect the accountant?

Personnel—What changes may be expected?
Customers Accounting—Is bi-monthly billing practicable?
Credits—Gas and Merchandise. Federal Regulation "W."
Bad Accounts—Present and future.
Customer Relations—Effect of National Defense policies.
Free Service—Will this be limited?
Allocating Costs—Is it Operation, Maintenance or Fixed Capital?
Priorities—Accounting for.
Property Records—Unit costs. Simplification.
Depreciation—Regulatory Attitudes.
Taxation—Revenue Act. Amortization.
Insurance—Personnel. Property. War Risk.

Sectional Vice-president E. N. Keller will hold one Business Meeting of his Section on Monday morning, October 20th. On Tuesday there will be a meeting of the Insurance Committee at 2:00 P.M. under the leadership of Reginald Fleming of New York; also seven Luncheon Conferences where members may discuss their pressing problems without reservation.

THE LUNCHEONS

Customer Accounting: Chairman, D. E. Maloney, Cleveland, Ohio.

Customer Collections: Chairman, Harold F. Quad, Newark, N. J., Leader, Herbert E. Cliff, Newark, N. J.

Customer Relations: Chairman, Harry Jeffs, Far Rockaway, N. Y.

General Accounting: Chairman, O. H. Ritenour, Washington, D. C.

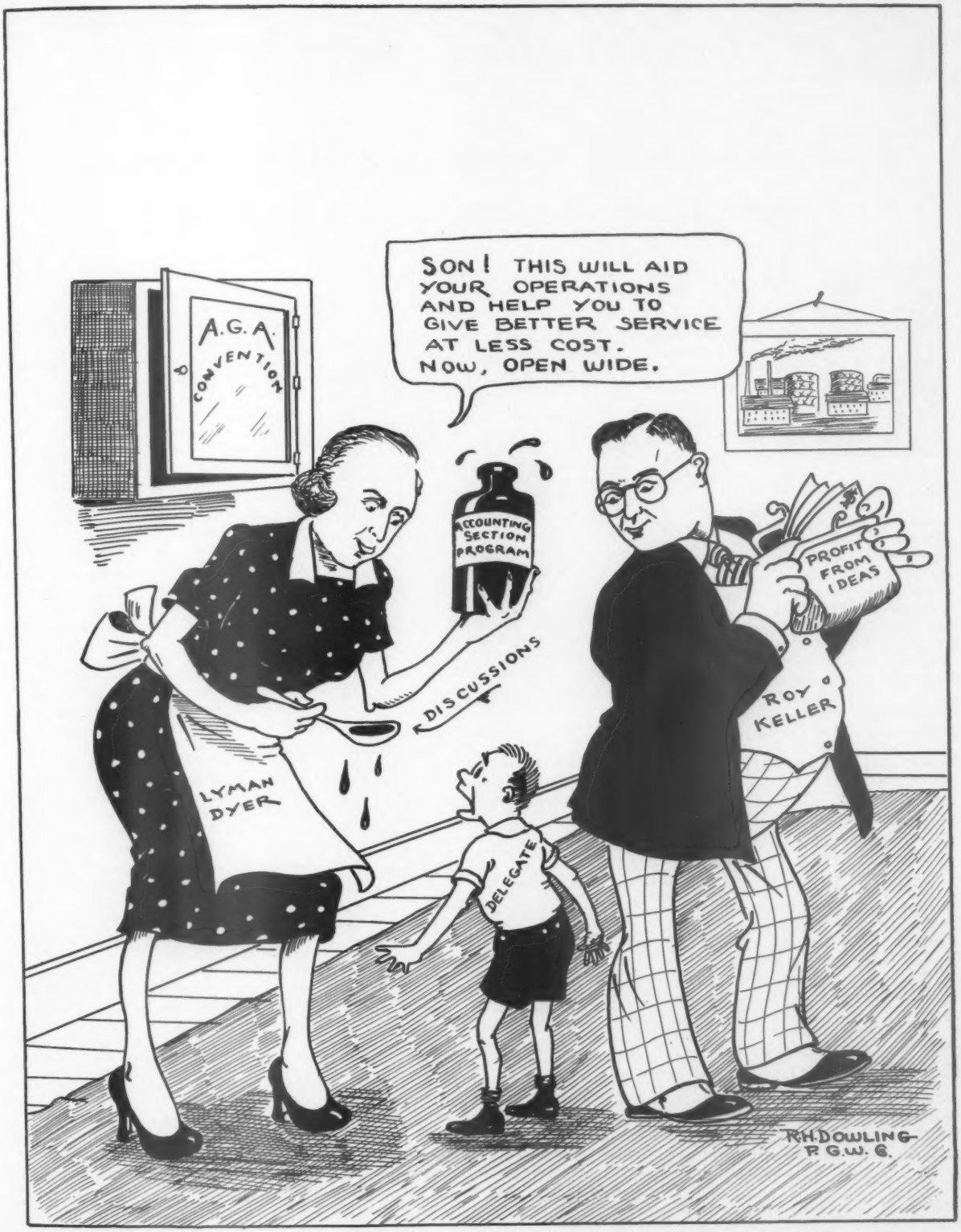
Property Records: Chairman, E. F. Wressel, Hammond, Ind.

Depreciation: Chairman, H. C. Hasbrouck, New York, N. Y.

Taxation: Chairman, R. M. Campbell, New York, N. Y.

BRING YOUR PROBLEMS TO THE LUNCHEONS

GET YOUR TICKETS EARLY


SON! THIS WILL AID YOUR OPERATIONS AND HELP YOU TO GIVE BETTER SERVICE AT LESS COST. NOW, OPEN WIDE.
A.G.A. CONVENTION
ACCOUNTING SECTION PROGRAM
DISCUSSIONS
PROFIT FROM IDEAS
ROY KELLER
LYMAN DYER
DELEGATE
R.H. DOWLING P.G.W.C.

Why a Certified Performance House Heating Equipment and Installation Program?

By W. L. Seelbach*

The Forest City Foundries Co., Cleveland, Ohio

W. L. Seelbach

IT is somewhat out of order for me to discuss the benefits of a National Certified Performance Program for gas-fired heating equipment and National Certified installation, as our company is not a large factor in the gas heating field, but we have been building warm air furnaces for fifty-one years so we should have a fairly good knowledge of what has happened to warm air heat in that time. Warm air heat is the heat in a large percentage of the houses in the United States.

Let's start with the coal-fired pot-bellied base burner in the living room,—next came the cutting of a hole in the ceiling so as to lead some warm air into the upper chambers,—next came the hot air furnace without any or only one cold air return. For quite some years, this was the standard installation and no improvements were made.

Heating Development and Trends

In about 1913 a definite trend was started. How many of you remember the pipeless furnace and its history? A good example was The Monitor Stove Company of Cincinnati which in 1915 started a tremendous selling campaign on these pipeless furnaces. The sales began in the West, swept Eastward and died out at Montauk Point on Long Island. The Monitor Stove Company started making a few thousand pipeless furnaces a year and built up to a volume of 40,000 furnaces in each of the years of 1919 and 1920. The pipeless furnace had run its course in 1921 and in 1923 The Monitor Stove Company had failed. The pipeless furnace did some good to hot air heating in the rural communities, but hurt the industry in the urban sections. The reason for this was that they did not do a good heating job.

Now there are a few pipeless furnaces being sold today that perhaps have their place. Incidentally, the gas floor furnace is an off-shoot of that original pipeless furnace.

Next came the boom building years of the late 20's, contractors were putting up houses by the hundreds, and hot air furnaces were being thrown in with the cheapest possible kind of construction and installation. Manufacturers cut prices to get business and an atrocious heating job developed. These houses had no insulation and were poorly constructed. The result was a surge to wet heat and justly so because there was no one to protect the home buyer.

I gave you the story on The Monitor Stove Company, but now let's see what happened to a second large furnace company. They were organized in about 1905, did a fair amount of business and made some profit from, say, 1911 to 1928 or 1929. The building boom was over, but they thought they were smart enough to corral all the remaining hot air heating business there was, so they decided to cheapen their installation by having their furnaces installed with the cold air duct coming down the outside walls to within 18" of the basement floor. They sold a lot of jobs on that type of construction, but the next winter was a cold one and nearly everyone of those jobs was a trouble-maker, in fact their sales got to such a low point that they got into financial difficulties and had to reorganize. In my mind you can blame it on trying to cut corners in doing a heating job.

It wasn't until the early 20's that the first major improvements on the standard type hot air furnace were made, and they were the making of a one-piece radiator and the construction that permitted ashpit and the feed section to come through the furnace front, making a considerably tighter and ash-proof furnace. This little advancement in construction came just before the first blowers were used. Whether the two had any relationship or not I don't know, but the addition of the blower to the hot air furnace was after the feed section and the ashpit construction came through the front eliminating the possibility of dust ashes being blown through the house.

As the use of the blower with a hot air furnace became recognized as a better heating system, the words "Hot Air" were changed to "Warm Air" and correctly so. We all know that forced warm air heat or winter air conditioning has a definite appeal to the heat-minded public and when it is put in right, is the best heating job you can get. I mean that just as I say it because there isn't a manufacturer or a utility that puts in a forced warm air job correctly that doesn't get the very highest type of praise from every consumer that has one.

Now somewhere along this time gas warm air furnaces became more popular. In the effort to sell gas, gas furnaces made a good outlet, so immediately manufacturers who never had any experience in heating, and manufacturers who had experience in only wet heat, started to build, sell and install these furnaces. You can put a number of utilities right along with them and say that they knew nothing of either forced or gravity warm air heat and how to handle it. The jobs that were put in were almost as bad as those installed in the old hot air days.

Early Installations Poor

These manufacturers and gas utilities that knew nothing of warm air heat hired boys for layout men and took their layouts for installation purposes. These installations were terrible. Cold air returns and warm air ducts with practically no insulation were run through garages where the doors were standing open all winter long. Some installers have not to this day lived down some of this poor installation work. This was all in the beginning of forced, gas-fired warm air heat. Gas furnaces and installations kept improving steadily until about two years ago when another building boom started.

We seem to be drifting back to the hot air days of 1927 excepting, thank goodness, we have a blower on a furnace that is helping distribute the heat in spite of the poor duct installations.

Due to the tremendous free advertising and sales promotion work that winter air conditioning has received, the buying public has been led to expect a good heating job, in fact a perfect one. As long as a furnace has a blower on it the public takes it for granted it is an air conditioning furnace and they look for what they were told

*Chairman, Gas House Heating and Air Conditioning Equipment Division, Association of Gas Appliance and Equipment Manufacturers.

they could get in the line of perfect heat. Due to the poor installations today there is going to be a trend, and the trend is not going to be that warm air heat is going back to wet heat, but the trend is going to be that, due to the tremendous publicity on winter air conditioning and the fact that there are some perfect installations of forced warm air furnaces, the long trend is going to go to oil heat. The home owner is going to blame the gas utilities for their heating problems and high gas bills, and not the installer and the manufacturer.

I have been discussing, perhaps too long, forced warm air heat. We have a lot of gas heating with gravity and you can do a good job with gravity heat if you will install it correctly and have correct sized unit. There is no reason why thousands of new homes should not have gravity type heat and be perfectly satisfied nor why many more hundreds of thousands of old homes should not be converted to either the gravity or the forced gas-fired warm air heat.

High Standards Essential

I have tried to show you a picture and give you some facts of the heating business —its developments and probable trends. Ninety per cent of the manufacturers want to build a first class gas-fired product and they want to see it installed in a first class way. They want to get a fair price for their gas furnaces. They want to be able to do a little research and development work, also National Advertising, and support the National CP heating program. They want to look into this question of panel heating and keep abreast of the heating developments, but you cannot do this with a cut-throat market. The manufacturers feel that the utilities must do their share in cooperating with them to see that the properly constructed and sized heating unit is used, and the proper installation is made. Now the manufacturer knows it is going to cost the gas utilities some money to police gas-fired warm air heating, but they expect them to do it. I have been a great believer and our company has always practiced it, that you cannot make money without spending some first.

The potential market for gas-fired warm air heat is actually beyond comprehension. The Committee of Ten—Coal and Heating Industry, in their April, 1941 Information Bulletin, shows on reports supplied by 118 manufacturers that there were $40,892,606 worth of warm air furnaces sold last year as compared with $30,000,000 in 1939. They state that it is estimated by various authorities in the Warm Air Furnace Industry that there were at least 525,000 warm air furnaces of all types sold in 1940. It is said that new house construction took at least 325,000 warm air furnaces with 200,000 being replacements. Now of the approximately $41,000,000 worth of warm air furnaces for 1940 about 20% or $8,284,000 were gas-fired.

Certainly the statements that I made earlier that there were hundreds of thousands of replacement furnaces that the gas-fired warm air market could get was not far wrong, and you can get it if you go after it in the right way. You can lose it by failure in developing it correctly and that is the failure of getting the confidence of the home owner that he is getting and will receive a heating system that will give him automatic comfort heat.

Let's get together on the development of this tremendous available market,—the manufacturers to do their share, and the utilities should support and promote good heating products and good installation with a National Certified Performance Program on gas-fired warm air heating and wet-heat, starting forward slowly and with the proper amount of caution but building up to a sales effort that will insure both the manufacturer and the utility the heating market they are entitled to and the customer the service he wants.

CP Gas Range Manufacturers Introduce Unique Story Book Fall Campaign

Cover of CP Range Planbook

A NEW and unusual theme for the promotion of CP (Certified Performance) Gas Ranges will be introduced in the Fall sales promotion campaign, now in the mails to thousands of gas utility executives and dealer merchandisers throughout the United States and Canada, it was announced by the CP Sales Management Committee of the Association of Gas Appliance and Equipment Manufacturers.

Using the interesting story book technique, while at the same time presenting in forceful and captivating style the CP merchandising story, both from the utility and dealer sales viewpoint, the campaign is considered one of the most novel and extraordinary direct mail promotions of its kind ever produced.

The campaign portfolio starts out with the familiar story book beginning, "Once upon a time . . ." and continues in that style reciting the trials and accomplishments of a man who made his living selling appliances. The salesman's wife finally sets him straight on what the American homemaker wants, pointing out that "1,742,000 modern gas ranges were sold last year and not only that, but thousands bought the very finest cooking appliance . . . the CP Gas Range!"

The story leads up to a complete merchandising plan for gas utilities and dealers, and is filled with potent and forceful sales aids for salesmen.

Regulations to Control Installment Credit

THE Board of Governors of the Federal Reserve System has issued regulations to control installment credit. The action was taken under authority of the President's Executive Order of August 9. The regulations took effect September 1 and are applicable to a list of 24 consumer durable goods. Also contained in the regulations are provisions governing certain modernization loans.

The regulations permit an 18 months' period for payment of all of the articles listed including mechanical refrigerators, ironers, cooking stoves, heating stoves, space heaters, room unit air conditioners, household furnaces and heating units for furnaces, water heaters, home air conditioning systems, etc. Minimum down payments on the articles above mentioned range from 10 to 20 per cent.

Administration of the regulations is through the 12 Federal Reserve Banks and their 24 branches, to which inquiries relative to the regulations may be addressed. Registration forms required by the regulations have been prepared, and will be available to registrants at Federal Reserve Banks and branches.

The regulations provide for the registration and licensing, by December 31, of all persons engaged in the business of making extensions of installment sale or installment loan credit, or engaged in the business of lending on the security of or discounting or purchasing obligations or claims arising out of such extensions of credit.

Copies of the regulations may be secured from any of the 12 Federal Reserve Banks and their 24 branches. They are entitled "Consumer Credit—Regulation W—as adopted August 21, 1941."

C. F. Carter Dies in Nashville

C. F. Carter

C. F. (NICK) CARTER, operations manager of the Nashville Gas and Heating Company, Nashville, Tenn., died in August following a brief illness. He had been connected with the Nashville utility since 1919.

A native of Macon, Ga., Mr. Carter was graduated from Alabama Polytechnic Institute in 1910 and became connected with The United Gas Improvement Company shortly afterward. During the World War he served as first lieutenant in chemical warfare, afterward returning to the Manchester, N. H., unit of the United company.

Mr. Carter went to Nashville as an engineer and held that position until 10 years ago when he became operations manager.

National Defense Slogan

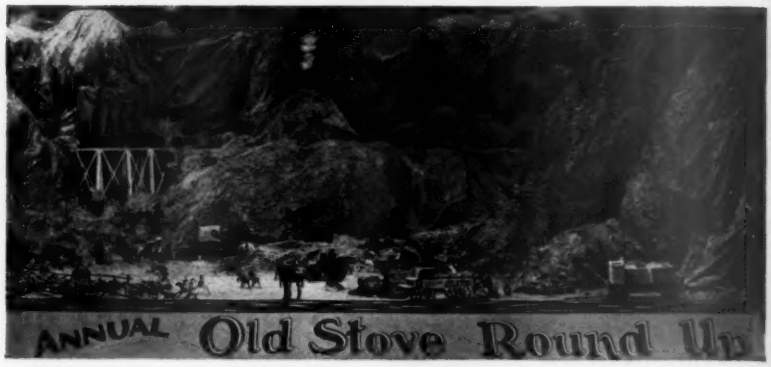
AS a national defense slogan, the Pacific Coast Gas Association has hit upon the following:

FOR AMERICA'S BIG JOBS

GUNS
AIRPLANES
SHIPS

It tells a timely, hard-hitting story which suggests the "Big Job" slogan used in A. G. A. national advertising and is a humdinger for use in local company advertising during the emergency. Why not make it a part of your program "for the duration?" The P.C.G.A. has given permission for anyone to use it. It first appeared on the cover of their convention program.

Background for Gas Range Sales



Typical of the all-out promotion staged by the Atlanta Gas Light Company in its 13th annual Old Stove Round Up was the attractive window display shown above. As "woolly" a western panorama as ever greeted the eye is there in miniature. Taking two months to build, the window stopped traffic day and night after its installation. Walter Maurer, company display manager, worked out the clever idea. To add dramatic realism, Mr. Maurer erected a loud speaker outside the window. As the train crossed the trestle shown at left it produced the characteristic "clickety-click" sound which was transmitted outside. The main sales floor was "dressed up" with realistic corrals, lariats, and salesmen were completely dressed in cowboy paraphernalia

Californians Capture CP Ranger Prizes

FINAL results recently released of the CP Ranger Club contest shows California Rangers leading the nation by capturing all twenty prizes in Division I of the three-month cumulative contest. These outstanding achievements were especially gratifying to the participating merchants and the utilities who sponsored the contest in their respective service areas.

Now in its third year, the CP Ranger Club, which is one of the country's leading sales fraternities, is sponsored by the American Gas Association to provide national recognition for outstanding sales achievements by gas company salesmen, dealers and dealers' salesmen in the sale of Certified Performance Gas Ranges. The California contestants were in competition with the range salesmen in New York, Boston, Chicago and Philadelphia. All cash prizes were donated by the CP range manufacturers of the Association of Gas Appliance and Equipment Manufacturers. Dealers and their salesmen became eligible to compete in the contest upon payment of the entrance fee by the utility company serving the area in which the dealer was located. Awards were determined by the officers of the CP Ranger Club based on reports from the various local Ranger Club representatives.

One of the interesting results of the contest was the fact that with only one exception, nowhere in the nation except in California were prizes won by dealer salesmen. In California every prize winner was a dealer salesman.

Art Samman, right, is commended for his work in winning first prize in the CP Ranger cumulative contest by Joseph M. Cullen, president, San Francisco unit, Gas Appliance Society. Others in the picture are, left to right: Charles R. Woodson, Frank Talcott, and Clifford Johnstone, managing director, P.C.G.A.

Canadian Exhibit Spurs CP Range Sales

CP booth at Canadian National Exhibition, Toronto, staffed by the Home Service Department, Consumers' Gas Company. Left to right—Norma MacPherson, Mary MacPherson and Inez Somers, Director

Industrial & Commercial Gas SECTION

H. Carl Wolf, *Chairman*
George F B. Owens, *Vice-Chairman*
E. D Milener, *Secretary*

Fundamentals of Partial Combustion of Gas for Industrial Purposes

By R. M. Conner

Director, A. G. A. Testing Laboratories

R. M. Conner

IT is a matter of record that during the first World War the use of gas for heating processes became an important factor in American industrial life. It is also a matter of record that in the second World War, American industry finds in gas an indispensable tool for arming the forces of democracy and in maintaining economic production for civilian purposes. One only has to review the paper given by Franklin T. Rainey, 1940 Chairman of the Industrial Gas Section, at the last Annual Meeting of the American Gas Association, in which he outlined the part industrial gas is now playing or will fulfill in our national defense program, to appreciate the vital role gas now occupies in industry.* He brings out, for example, that while the business index of 1940 was below that of 1929, the use of industrial gas increased 50% during that period. We can justifiably take pride in the achievements Mr. Rainey so ably describes, and accept them as a challenge to redouble our efforts to assure continued progress in the industrial use of gas.

A. G. A. Research

Research has been an important factor in the rapid increase in industrial gas usage between World War I and II. Leaders of the gas industry have been aware of this necessity for years. The American Gas Association through its Committee on Industrial Gas Research, of which F. J. Rutledge is Chairman, has promulgated research in various aspects of the industrial gas utilization field. Of the numerous problems carried on under this committee's direction, none is more interesting or holds more promise of being integrated with our future progress than that being conducted currently at the Association's Testing Laboratories on partial combustion of gaseous fuels.

What prompted this research program? It has been fully recognized that in many modern heat-treating processes, a controlled heating atmosphere is essential because of a need for exact oxidizing, reducing, or neutral conditions. The simplest and most efficient method of establishing this control with gas is to design equipment which will not only supply heat necessary for the desired reaction, but will also surround the work with gaseous constituents in the proportion required for consummation of the heat-treating process.

Fundamental Knowledge Needed

Heating operations are relatively simple if oxidizing atmospheres are desired. Complete combustion of fuel gas is easily and efficiently maintained with a controlled quantity of excess air, part or all of which may be injected either as primary or secondary air. Where reducing or neutral atmospheres are desired, the problem becomes more complex. There are many industries where these atmospheres are successfully utilized, but basic principles of the combustion process are less completely understood than for combustion under oxidizing conditions because methods were developed by trial and error. Consequently, some of the information published on this subject appears to be incomplete, and attempts to duplicate successful processes often meet with failure due in many cases to ignorance of the basic principles involved. It was this obvious lack of fundamental knowledge which prompted the Committee on Industrial Gas Research to authorize and direct research in reducing atmospheres produced by combustion of fuel gases.

Results of research conducted on this problem at the American Gas Association Testing Laboratories have revealed that for a given fuel gas, composition of flue products may be varied over a wide range by limiting the air required for combustion. For example, when such air supplied with natural gas was reduced from 100 to 67%† of that required for complete combustion, CO_2 concentrations in flue products dropped in direct proportion to air decrease from 12.1 to 6.4% of the total dry flue products, water formed also decreased from 22.1 to 18.0%, CO increased from less than 0.1 to 8.8%, and hydrogen increased from less than 0.1 to 9.0.% Although free oxygen was present at 100% aeration to an extent of 0.35% of the total dry flue products, its concentration decreased to a minimum of 0.05% at 95% aeration, and increased very slightly as aeration was further decreased. Free hydrocarbons did not appear in flue gases until combustion air was reduced below 80%. As combustible limits were approached at lower aerations, however, methane was found and its concentration increased to approximately 0.5% at the end point, which was 67 and 77% for the ceramic and water-cooled furnaces, respectively. No ethane remained in any of the flue gases obtained at various aerations.

Manufactured Gas Results

Somewhat similar trends were obtained with manufactured gases, except that the minimum quantity of air required to support combustion was less than that required for natural gas. Manufactured Gas "A"‡ could be burned with only 58% of the air theoretically required for complete combustion, and combustion of Manufactured Gas "B"‡ was obtained with only 55%§ aeration. As carbon dioxide and water vapor approached ultimate values obtained with 100% aeration, very small quantities of combustible constituents were obtained in furnace atmospheres. When air supply was decreased, however, carbon dioxide and water content also decreased, and percentages of combustibles increased. When air supplied with Manufactured Gas "A" in the water-cooled furnace was reduced from 100 to 58% of that required, average concentrations of carbon dioxide and water vapor decreased steadily from 10.3 and 26.0% to 4.0 and 20.5%, respectively, of the total dry flue products. Meanwhile, carbon monoxide and hydrogen increased from less than 0.1 and 0.2% to 9.2 and 12.8%, respectively. As in the case of natural gas, oxygen content decreased from a maximum of 0.35% at 100% aeration to a minimum

* See abstract, A. G. A. Monthly, Nov., 1940, Page 379.

† Continuation of research on this project has resulted in data for considerably lower aerations than those reported herein.

‡ The manufactured gases differed only in respect to illuminants, carbon monoxide, ethane, and nitrogen content. Heating values were 544 and 534 B.t.u. per cu.ft., respectively. Both had a specific gravity of approximately 0.4.

§ Continuation of research on this project has resulted in data for considerably lower aerations than those reported herein.

of 0.15% at 95% aeration and then gradually increased with decreasing air supply to 0.20% at 70% aeration.

Above 75% aeration, concentrations of hydrocarbons were practically negligible. As the percentage of combustion air was decreased below this point, however, higher concentrations were found. Methane content increased to approximately 1.0% and illuminants to 0.5% at the 58% aeration end point. It is interesting to note that although the ratio of methane to illuminants was approximately 10 to 1 in the original fuel gas, this ratio was reduced to 2 to 1 in the flue gases. This would seem to indicate that methane is more readily burned or cracked than illuminants under conditions of minimum aeration. Similarly, the total absence of ethane in any of the flue products demonstrates that this compound reacted more readily than either methane or illuminants.

Trends found with Manufactured Gas "A" were also noted with Manufactured Gas "B" when burned in a ceramic-walled furnace, except that differences in fuel gas composition resulted in different percentages of flue gas constituents. When aeration was decreased from 100 to 55%, water vapor and carbon dioxide contained in flue gases decreased from 22.5 and 11.8% to 14.2 and 5.0%, respectively, of total dry flue products. Carbon monoxide and hydrogen increased from less than 0.1% each to 11.5 and 14.8%, respectively. Methane increased to 0.8% at 55% aeration, and oxygen did not exceed 0.10% at the lowest possible aeration point.

Effect of Air on Composition

In studying effects of quantity of air on composition of flue products, another characteristic was also observed, namely, that exerted by the total quantities of free or combined hydrogen and carbon contained in the fuel gas being burned on the resultant flue gas composition. Analyses of data disclosed that although the various constituents in the fuel gas determined its combustion characteristics, total quantities of free or combined carbon and hydrogen have a greater influence on volume of each flue gas constituent formed. At any given percentage of aeration the ratio between CO and CO_2 was very nearly the same for all three gases. For example, at 90% aeration 20, 20, and 18% of the total carbon in natural gas, Manufactured Gas "A," and Manufactured Gas "B," respectively, was present as carbon monoxide and the remainder in each case was present as carbon dioxide. At 70% aeration, 52, 51, and 50% of the total carbon was converted into carbon monoxide, 46, 46, and 48% became carbon dioxide, and the small amounts not accounted for in this figure appeared as hydrocarbons. Similar relationships were developed for hydrogen and water vapor.

Changes in flue gas temperatures had a relatively minor effect on concentrations of flue gas constituents. No single change in concentration greater than 0.5% of the total dry flue products was observed for any temperature change imposed, although this does not necessarily mean that temperature may be disregarded for all industrial applications. Flue gases were cooled very rapidly in this work, and it is possible that a longer time factor may have produced different results. Cooling from more than 3000° F. to less than 1800° F. was accomplished in approximately 0.2 sec. It is also possible that employment of other types of furnace wall materials, instead of brass and ceramic materials, may have brought about a catalytic action that might in turn have altered this situation.

Minimum aeration required to support combustion was influenced by furnace wall temperature, however, and this accounts for appreciable quantities of unburned hydrocarbons in flue products at aerations approaching the lower combustible limit. It has been pointed out that as the lowest possible aeration required to support combustion was approached, quantities of unburned hydrocarbons present in flue gases increased appreciably. This was caused by loss of heat to the combustion chamber walls at such a rapid rate that the flue gas temperature was only slightly above ignition temperature of the fuel gas-air mixture. Consequently, less heat was available for cracking the remaining hydrocarbons.

The foregoing is a very brief summary of some of the data contained in American Gas Association Testing Laboratories' Bulletin No. 11, "Combustion of Furnace Atmospheres Resulting from Partial Combustion of Gaseous Fuels." As indicated from the few data given, utilization of the relationships developed during this research not only reveals fundamentals of the mechanics of combustion of gaseous fuels when burned with a deficiency of air, but provides a method of predicting compositions of flue gases from any known fuel gas. This research is being continued and it is expected that the new data being obtained will throw further light on the complex reactions involved during partial combustion of gas.

October 23 Is Industrial Gas Day at National Metal Exposition

AT the National Metal Congress and Exposition, Public Auditoriums, Philadelphia, Pa., the week of October 20, Thursday, October 23, immediately following the close of the A. G. A. Annual Meeting in Atlantic City, has been designated as Industrial Gas Day. Gas men returning from Atlantic City are invited to attend the Industrial Gas Breakfast at the Benjamin Franklin Hotel, Thursday morning and to see the sixteenth *A. G. A. Combined Industrial Gas Exhibit* at this leading 1941 meeting of the metal industry.

On Thursday morning, at 8:30 o'clock, the Industrial and Commercial Gas Section will hold the annual *Industrial Gas Breakfast* in the Benjamin Franklin Hotel. This is especially planned for industrial gas men visiting the Metal Exposition and it is expected that the usual large number will sit down together with interesting speakers from the gas and metals industries. Tickets for the Breakfast may be obtained at the Registration Desk of the A. G. A. Annual Meeting in Atlantic City or at the hotel.

A special feature of Industrial Gas Day will be a "Symposium on Controlled Atmospheres" Thursday morning. Ten authorities will participate in the forum which has been divided into four specific subjects, all of which are of particular interest to industrial gas men. These defense forums have been planned by government officials and production executives of defense equipment manufacturers with the purpose of devising means for increasing defense production and for the conservation of metal resources and substitutes. Industrial gas men will find an opportunity for frank discussion of their problems with Washington national defense representatives, an interchange of ideas and a revelation of the most pressing needs of the nation. At the big Exposition there will be an unequalled opportunity for selling gas and gas equipment for both ferrous and non-ferrous metal treating and melting and for general factory use, as attendance will be from every state and from Canada.

This year the Combined Exhibit, using about 6,000 square feet made possible by subscribing gas companies within a 200-mile radius of Philadelphia, will have a central *Gas Industry Plaza* around which the 18 cooperating exhibiting industrial gas equipment manufacturers will plan their displays on the theme, NATIONAL DEFENSE NEEDS SPEED, INDUSTRIAL GAS MEANS SPEED FOR HEAT TREATING. The national colors with white for the background have been chosen for decorative purposes. In the Plaza will be an exhibit of specialized industrial gas equipment for general factory use, as well as the featured continuous showing on a built-in screen of industrial gas installations in national defense factories and mills, which will give the nation's defense producers a chance to take stock of their progress and study new methods and equipment for speeding defense preparations.

Tickets for the National Metal Exposition can be secured at the Registration Desk of the A. G. A. Annual Meeting in Atlantic City. Gas men will find they can save time by getting their tickets ahead in this manner. There is no charge to gas men. Remember—Industrial Gas Day, Thursday, October 23, at the National Metal Congress and Exposition, Municipal Auditoriums, Philadelphia, Pa.

Home runs: Good stereotype melting equipment, electric, is replaced with better stereotype melting equipment, gas. Where? At the Brooklyn Daily Eagle. One reason? To help get hot news of the Dodgers out on time. . . . Also, Brooklyn Union has just installed a 30 hp gas boiler in a gin distillery. Is gin the proper drink for toasting the Dodgers?

◆

"Better food and less waste" . . . Health . . . Efficiency . . . Conservation . . . For Defense—that's what restaurant operators are saying these days according to a leading spokesman of that industry, AMERICAN RESTAURANT. The A.G.A. Exhibit, National Restaurant Exposition, Chicago, October 6-10, will show *how gas* can help them get what they want.

◆

Can't keep a good thing down—At Elmhurst, L. I., we note the third gas summer air conditioning installation in an airplane instrument factory has been made.

◆

Why not invite a big customer to be your guest at the annual Industrial Gas Breakfast at Philadelphia's National Metal Congress and Exposition, the week of October 20. We're meeting in the Terrace Garden, Benjamin Franklin Hotel, at 8:30, Thursday, October 23. That's Industrial Gas Day at the Metal Congress, you know!

◆

Spotlight on power—That industry is showing real interest in the kind of work our Gas Engine Power Committee is doing in high-temperature gas engine cooling. The magazine, POWER, in its July and August issues, goes to town with the paper Chairman Manley H. Clark gave at the last natural gas convention.

We sneaked a peek at the Committee Reports booklet being polished up at Headquarters for Atlantic City. You're gonna like the new handy form—11 industrial and commercial committees report their year's work under one cover.

◆

"Only gas carburizing appears satisfactory for heat-treating gears for aircraft engines, particularly on medium and high-alloy steels," said John L. Buehler, Indiana Gear Works, to the delegates at the 25th annual meeting of the American Gear Manufacturers' Association (STEEL, September 1, pp. 78). Thanks, Mr. Buehler —we think so too!

◆

And now—the first diner to be gas summer air conditioned! A slick, entirely automatic, absorption system puts the final touch of comfort in dining for guests at Simpson's Diner in Houston, Texas, and, Mr. Simpson says, puts more profits in his pockets. You have diners in your city, so . . . .

◆

Defense briefs: Canada's new optical glass factory, said to be the first such plant in the Empire out of range of Hitler's bombs, uses gas for all major industrial heating operations. One big natural gas company's industrial gas load is running over 60% for shells, guns and other defense armament, and a similar size manufactured gas company is running over 55%. . . . The defense effort is causing more gas heat-treating furnaces to be advertised in the metals magazines than ever before.

◆

Tip to industrial departments—We like the way one large gas company each month lists its new industrial and commercial loads in its house organ. Do you use *your* magazine to keep all your employees up-to-date on new industrial and commercial loads?

◆

R. D. McCabe of Hobart Manufacturing Company is a non-gas man who has done a conscientious job as a member of the Volume Water Heating Committee. He's an expert on mechanical dish washers. Thanks for your cooperation, Mr. McCabe.

◆

Clip 'em and use 'em: Heat Treating and Magnesium Alloy Castings, INDUSTRIAL HEATING, August, p. 854, describes a new type radiant tube convected air furnace . . . Fabric Drying Speed Doubled, TEXTILE WORLD, September, p. 90, an interesting adaptation of gas-fired booster heaters to finishing in several Paterson textile plants . . . Engines for Locker-Plant Power, POWER, August, p. 114, a well-written case history of a recent Texas installation . . . Selecting Refractories for Industrial Furnaces, INDUSTRIAL HEATING, September, p. 1014.

◆

Want a preview of how this stuff we sell may be used in days to come? A big automobile manufacturer has just put into operation an *air conditioned* heat treating room with 12 big gas furnaces. Stainless steel walls and other trimmings, too. Go on, call us what you think we are, but we ain't foolin' 'cause 'tis true.

INDUSTRIAL AND COMMERCIAL NATIONAL GAS ADVERTISING FOR OCTOBER

The National Advertising Committee of the Industrial and Commercial Gas Section, J. P. Leinroth, chairman, and F. B. Jones, vice-chairman, announces that full-page advertisements will appear in the trade and business magazines listed below during the month of October. These advertisements, which will appear in 16 publications reaching a total audience of 288,587, are prepared in cooperation with the Committee on National Advertising as a part of the Association's national advertising campaign.

General Manufacturing

BUSINESS WEEK (Oct. 18—⅔ page ad)—If it's done with heat and you've *got* to do it faster—do it with modern high-speed *GAS* equipment.

Ceramic Industry

CERAMIC INDUSTRY—"Turn out the ware!" . . . and do it faster, better with modern *GAS* equipment.

Baking Industry

BAKERS' WEEKLY (Oct. 11)—Yes, Sir, it *PAYS* to bake with *GAS*.

Industrial Processing Fields

CHEMICAL AND METALLURGICAL ENGINEERING—To hold down costs . . . and still keep pace with orders—*GAS* and modern *GAS* equipment can help *you*.

Metal Treating & Melting Field

*THE IRON AGE (Oct. 9)
STEEL (Oct. 13)
METALS & ALLOYS
METAL PROGRESS
INDUSTRIAL HEATING
—To hold down costs . . . and still keep pace with orders—*GAS* and modern *Gas* equipment can help *you*.

(*National Metal Show Issue)

Food Service Field

AMERICAN RESTAURANT—*Here's* why—the trend is to *GAS* for all Commercial Cooking.

HOTEL MANAGEMENT—Who said—"he'll never smile again?" give him modern *GAS* cooking equipment and watch the results. . . .

CHAIN STORE AGE (Fountain and Restaurant Section)—You can't fool a cost-sheet! No wonder today's chain stores choose modern *GAS* cooking equipment.

What Is Ahead in Gas Measurement?

By D. P. HARTSON*

Operating Manager, Equitable Gas Company, Pittsburgh, Pa.

PRACTICALLY every one in the gas industry can remember the days before the radio and the days when television was unheard of. Certainly every one in the room has seen the development of the airplane from the experimental stage to its present advanced status. I mention these developments not only because they have a profound effect on our present manner of living but also because they have been steadily developing under our eyes during the past two or three decades. They are indications of progress in the development of mechanical and scientific equipment which we see on every side.

One might readily ask: "In the meantime, what has happened in the natural gas industry, and particularly in gas measurement?" We look around us and see the natural gas derrick substantially as it was twenty-five years ago, and this derrick, being to a great many a symbol of the industry, might easily lead people to think that the natural gas industry had been standing still. This is very far from being the case. Let us look at some of the things which have been happening in the natural gas industry.

Geological Developments

Twenty years ago the natural gas geologist in these regions was generally respected as an educated gentleman, which he usually was, but the old timer, at heart a practical man, generally felt that he could locate wells better than the best geologist, and certainly could locate them in more accessible locations than the geologist usually made. What is the picture today? We have seen in the last ten years a tremendous development in geological and geophysical work, and more dependence is being placed on the work of the geologist and the technical man at the present time than ever in the history of the industry.

I do not need to remind you of the tremendous development in mechanical equipment which is in common use—heavy trucks, tractors and bull dozers, portable mechanical cleaning-out equipment, ditching machines, back fillers, and numerous other devices which have enormously speeded up the work of every gas company. We have seen the development of steel pipe of greater tensile strength which permits much higher transmission line pressures and, in turn, requires much more highly developed compressors for gas transmission. That much of this matter of higher transmission line pressures and increased transmission capacities has been developed right here in West Virginia by engineers of the Hope Natural Gas Company, is too well known to be recited here. That same company has also developed the liquefaction and storage of natural gas for meeting peak day loads.

Gas Appliance Progress

We have seen a tremendous development in gas-burning appliances. The modern gas range of today is similar to the range of twenty years ago only in that they both use gas, although the range of today burns much less to do the same work. One of the real problems of the gas industry is that of having the customer use modern gas-saving and labor-saving appliances. Too often our service is judged on the basis of appliances which are inefficient and sadly out-of-date. What I have said of the gas range is also true of the water heater and house heating equipment. Gas-burning equipment is available which has been scientifically designed for better service at lower cost to the customer.

All of these items which I have mentioned have shown, you will agree, a very considerable amount of progress and development in the past twenty years. What about gas measurement? Has it been standing still? Let me just call to your attention some of the things which have been developing over the recent years in gas measurement and some of the equipment which we are all using in our daily work.

Twenty years ago proportional meters were in fairly general use for the measurement of gas in large quantities. Where would you find one today? And would anybody use one in this day if it was presented to him as a gift? The matter of taking specific gravities in the field was at best a rather crude operation. In fact, except in the case of large metering stations, the matter of gravity was generally overlooked. The portable precision instruments which are in use generally today are a far cry from the old diffusion bottle.

Twenty years ago the measurement of gas by orifice meter was being used to quite a considerable extent, but consider the refinements which have occurred during these past twenty years. A large amount of work has been done in the matter of calibration of orifices and in meter run design, all of which has resulted in American Gas Association bulletins being published for the industry and greatly advanced accuracy of orifice meter sets. Better equipment all around is available for orifice meter measurement. Not so long ago the matter of taking care of measuring loads of wide hourly and daily variation was a serious problem. Today, by the use of differential limit controls this is no longer a serious problem.

I hardly need remind you of the research work which has been done on the determination of super-compressibility and of the application of this work to the measurement of gas in large quantities. Although it may not be in general use, we all know that it is possible at the present time to have remote indicating and control equipment to govern gas flows and pressures. The remote recording of pressures, however, is in common use in the industry.

Pressure Control Improves

I could go on for some time mentioning the many developments with which you are so familiar and which these courses here at Morgantown have been designed to keep us acquainted with, but that is hardly necessary. We all know that there has been a very decided improvement in the design of pressure regulators and in the control of pressures, also the use of loading devices for certain types of service. Large volume high pressure meters can be tested in the field with great accuracy by the use of modern equipment. Twenty years ago orifice meter charts were calculated by a laborious hand process which has been eliminated by the use of the chart integrator.

All that I have said refers to the present and to the past. Does it look reasonable that while in the past gas measurement has shown a steady march toward greater accuracy and refinement, that this march is going to end with the year 1941? What developments will be seen within the next ten years I am not in any position to forecast. I do know, however, that there are going to be developments. I am sure that you have all heard the story of the man who some forty years ago resigned his job in the patent office in Washington because,

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* Chairman, Technical Section, American Gas Association.

Presented before the Appalachian Gas Measurement Short Course, Morgantown, W. Va., August 20, 1941.

as he thought, all of the things which could be invented had been invented. Of course anybody with that limited outlook really should resign because for him there is little in the future. Changes and improvements are coming. There is no doubt about that.

When we consider the real objective of gas measurement, what is it? Is it not really a development to insure fair business dealings? By that I mean that the customer is to get exactly what he pays for and that the company will receive payment for what it sells—no more and no less. The carrying out of this idea has advanced from a very crude beginning, for we have all heard the old timer tell about the time when the amount of gas used by a customer was estimated. Later it was estimated by the number of rooms in his house, and then by the number of gas-burning appliances; and finally the use of meters.

Cost Factor in Measurement

When the cost of gas measurement becomes too great in proportion to the amount of the transaction between the company and the customer, it is an unnecessary burden on both sides. This is something which deserves considerable consideration, particularly in the case of domestic customers. We all appreciate that a large number of these customers on our lines are being carried at no profit and in too many cases at a decided loss. Naturally, we could not afford to put all the refinements of gas measurement on such domestic or house meter installations. Corrections for gravity, moisture content and other corrections which we use in selling gas in larger quantities, would, of course, be absurd when dealing with the domestic customer because the cost of these refinements would be all out of proportion to the value of the transaction between the customer and the company.

In this state, as in most other states, the natural gas utility is required to change and test the meter of the domestic customer on a time basis. This is a source of considerable expense to the utility. The rule has to be followed whether or not the customer is a profitable one and regardless of the amount of gas which the customer has used. It stands to reason (and I believe it can be proven if we in the industry gather enough data) that the amount of gas passing through a meter has a far greater influence on any tendency to become inaccurate than the matter of time only.

At the present time we are changing meters on a five-year basis. Some of these meters may have passed as little as 60,000 cubic feet or less in five years, while the same size and type of meter in another installation may easily have passed over twenty times as much and consequently had over twenty times as much wear on the working parts. In the one case, without penalty to either the customer or the company, the meter might well have stayed in service for ten years or more; in the other case, the meter might well have been changed in a shorter time than five years, depending upon the experience with that type of meter; and the company, in the case of the greater consumption, might well afford to spend more money on the meter.

In the city of Pittsburgh we have had a few cases where meters have become "lost"; in other words, while they were on the meter reader's book and the people were being billed regularly, they were not shown on the records of the operating department and consequently were not picked up for the regular five-year change. Over the course of several years some of these meters, which have been in service as long as twenty years without changing, when taken out and tested proved within the legal limits of accuracy. I am not advocating that we leave all of our meters in for twenty years, but I do believe that we can well afford to spend some time to determine the relationship between meter mileage or amount of use and accuracy. I happen to know that our Commission would be very receptive to data which could be developed along these lines. Our own company is gathering such data and together with other companies which are doing the same, we hope to be able sometime to convince the Commission that the time basis is not the fair one for either the customer or the company. A few states have attempted to govern the time of meter change for periodic test on the amount of money received by the company for gas passing through the installation. This is an attempt to get away from the arbitrary time basis of making periodic meter tests.

State Regulations

Five states have rules which require the changing of domestic meters every seven years. One state, every six years. Eleven states stipulate no time limit, leaving the matter up to the discretion of the utility. Eight states have no jurisdiction on the matter and most of the others require a five-year change. The reason why five years was chosen no one seems to know. There seems to be nothing to justify such a short period in the case of meters measuring natural gas in this area. The arbitrary time basis is quite likely to stay until the natural gas industry proves to the Commission that such a basis is not properly or economically serving the customer.

I mention the matter of the use of gas measurement refinements where not justified because of costs and the matter of changing meters on an arbitrary time basis to show the necessity for gas measurement men to be on the alert to see that the public and our law makers do not require gas measurement procedure which is too expensive in proportion to the revenues involved. Such procedure in the end would result in an unnecessary burden on our customers.

The meter manufacturers have done a good job in keeping the cost of their equipment down in spite of advancing labor and material costs. I can't help but believe that this meter school has given the gas measurement men many ideas which have resulted in better methods and have also permitted the utilities to better meet advancing costs all along the line. After all, we are trying to give the customer the best possible service at the most economical cost.

Looking Ahead

Had I been able to find some one who could have forecast for me what really is going to happen in gas measurement over the next ten years, it would have been a pleasure to have brought to you such a prediction, and I am sure that you would all have been very much interested in any prophecies along that line. We do know that there have been tremendous advances in the technique of gas measurement during the past twenty years and, indeed, during the past five years. It stands to reason that the progress along that line is not going to stop now. So what are we going to do about it? I believe that you men here are doing the very best thing that any one concerned with gas measurement in the natural gas business could possibly do—that is, you are coming here each year to listen to men who are experts on meter manufacture and also on the use and maintenance of meters and other equipment to keep yourselves thoroughly up-to-date. I could suggest no better way to prepare yourselves for the developments which the future may hold in store than by studying the mechanical and scientific principles underlying gas measurement and pressure regulation as you have been doing here. Not only are you keeping abreast of the developments of your own job but you are putting yourselves in position to grasp and understand any new device or principle which may be brought out in the future for the benefit of the gas industry.

I wish to congratulate the committees which have worked so hard on making these annual Appalachian Gas Measurement Short Courses the success which they have been. They have given us what we all need to keep abreast of a business which is becoming more technical and intricate each year. Further improvements are bound to mean further refinements and more intricate gas measuring appliances. I feel very sure that this crowd will be in position to take their rightful places in any development which may come.

Technical Section Names Wolfe for Vice-Chairman

JOHN H. WOLFE, general superintendent of gas operations, Consolidated Gas Electric Light & Power Co. of Baltimore, has been nominated for vice-chairman of the Technical Section to serve during the coming year. Election of officers will take place at the Annual Meeting of the American Gas Association in Atlantic City, N. J., October 20-22.

"Fuel-Flue Gases" Book Reprinted

Louis Shnidman

THE book, "Fuel-Flue Gases," which was published last year by the American Gas Association, and prepared under the auspices of the Subcommittee of the Association's Technical Section Chemical Committee, has enjoyed an unprecedented success.

The entire printing of the first edition has been exhausted for several months. Owing to continuing demands for this book, both from those within and without the industry, the Subcommittee has been authorized to proceed with a reprinting of this book. This work has been under the direction, as before, of Louis Shnidman of the Rochester Gas & Electric Corporation.

The reprint of the first edition of "Fuel-Flue Gases" is now available.

The book represents an authoritative presentation and discussion of fuel and flue gases including their properties, behavior, and utilization. Errors discovered in the first printing have been corrected. In many cases additions in the text and in the form of addenda have been made.

Contents of "Fuel-Flue Gases"

In its present form the book contains an introduction and nine chapters. The introduction considers the basic gas laws and their application with specific reference to fuel gases. Chapters I, II and III consider in some detail the composition of the many types of fuel gases, the physical properties of these gases and their constituents together with their application and interpretation. Chapter IV on Inert Gas Safety discusses the fundamental principles and data relative to purging. It contains information that has not been collected hitherto. In addition, it includes a general treatment on inflammability of gaseous mixtures, as well as a useful bibliography.

Chapter V on Specific Constituents of Fuel Gases presents in detail the various constituents that may be found in the diverse types of fuel gases, considering their general properties, references to methods of test, the significance of results obtained, and effect of such constituents on operating conditions. Chapter VI on Deposits in Distribution Systems is a handy reference for the distribution engineer, considering the various deposits, stoppages, and related troubles that the distribution engineer may encounter in his work.

Chapter VII considers atmospheres other than those from combustion, while Chapter VIII discusses furnace atmospheres. The rapid development in the application of controlled atmospheres in the proper treating of metals make this chapter valuable to the industrial engineer. The final Chapter on Flue Gas Analysis deals with the application of flue gases with specific examples.

"Fuel-Flue Gases" will serve as a handy reference manual for the executive or manager; for the production engineer in solving problems of operation; for the utilization engineer in considering the application of fuel gases; for the distribution engineer in attempting to render the best service possible; for the industrial engineer in his contacts with industry in general; as well as for the chemist for reference to the fundamental properties of fuels, and even service men are in position to benefit from the data in this text.

"Fuel-Flue Gases" makes a handsome addition to the desk or book case with its silver-like water-proof cover. Large easy-to-read charts are made possible by the 8½ x 11" pages. At a special price of $2.50 this text will be a premium because the reprinted edition is limited to 2000 copies. A prompt order to the American Gas Association, 420 Lexington Avenue, New York City, will assure receipt of your copy.

Prominent Gas Engineer Passes Away

H. G. Terzian

HARUTYUN G. TERZIAN, gas engineer of United Engineers & Constructors Inc. and formerly with United Gas Improvement Company, died suddenly of a heart attack on September 2, in Canada, where he was on a business mission. He was 53 years old.

Mr. Terzian was recognized as an outstanding authority on the production of carburetted and blue water gas, in which line of work he had been engaged for nearly thirty years. His work brought him into contact with the gas engineers of many of the leading gas and chemical companies in this country and abroad. His opinion was held in the highest esteem.

Developed Terzian Factor

As a member of the American Gas Association, he took an active part in its technical work. He presented a paper at the 1936 Production and Chemical Conference, as well as at the general A. G. A. Convention of that year, entitled "Method of Determining the Relation of Generator Fuel, Oil and Tar in the Evaluation of Heavy Oil for Carburetted Water Gas." This method, which bears his name, is in general use for controlling the production of carburetted water gas.

Mr. Terzian was born in Diarbekir, Turkish Armenia, and attended the Armenian National School and the American University at Beirut, Syria. He specialized in mathematics and physics, and instructed in these subjects at the University for three years. He then came to this country and graduated from Syracuse University where he received the following degrees: B.A. 1907; M.A. 1910 and M.E. 1913.

He started his career in the gas industry in 1913 in the Gas Production Department of the Syracuse (N. Y.) Lighting Company. After a few years, he entered the Experimental Plant of the United Gas Improvement Company, at Philadelphia, and subsequently became manager of this plant.

In 1917, he enlisted in the U. S. Army and engaged in the Government program of benzol and toluol production. During the years of 1918 to 1921, he assisted in the development of a cracking process for the production of toluol. He then continued his work at the U.G.I. Experimental Plant, and in 1928, became a member of the then formed United Engineers & Constructors Inc. to engage in operation and development of gas production apparatus and processes.

Mr. Terzian had had an important part in the research work of both companies. Many of his developments have resulted in United States Patents. He has made a substantial contribution to the technical development of the water gas industry.

Mr. Terzian, a 32nd degree Mason, was a member of the American Gas Association, American Society of Mechanical Engineers, Tau Beta Pi and the A.R.F. Club, also Armenian Apostolic Church of Philadelphia. He is survived by his widow and four children.

That Drip Tank Unit *Was* Larger!

THOSE who read John W. Thurlow's excellent article on drip pumping procedure at Detroit in the September issue of the A. G. A. MONTHLY may have been puzzled when they viewed the two pictures of drip tank trunks in the lower right hand corner of page 323. It wasn't an optical illusion that the 150-gallon unit appeared larger than the 520-gallon unit, but the captions of the two pictures were inadvertently reversed. The editor's sorry, the printer's sorry, the proof-reader's sorry, everybody's sorry! We hope it won't happen again.

Defense Bibliography Gets Comment Abroad

THE comprehensive "Bibliography on National Defense and Air Raid Precautions for Public Utilities" compiled by Luis Hilt, librarian, American Gas Association, and published in the July-August issue of the A. G. A. MONTHLY has filled a special need of the gas industry judging from comment here and abroad. Of particular interest are the following extracts from letters from two members of the British trade press:

W. Rupert King, director of *The Gas Journal*:

"Thank you very much for sending us the pages from the A. G. A. MONTHLY showing the A. R. P. bibliography. It appears to be a comprehensive summary. Since, however, you invite comments and suggestions, I can only say that of course there is far more interesting material *unpublished* than has ever been allowed to appear in print. In my personal view there has been far too much secrecy in connection with real experiences actually "under fire." That which has appeared in print has been largely theoretical; the other of course is the genuine article. However, the powers-that-be have decided that much of the available information would be of use to the enemy and it has therefore been passed round either in very secret documents or by word of mouth. I believe, however, that your Association through its contact with our Institution of Gas Engineers has probably gleaned a very great deal of interesting facts. I only hope you may never have to put them to practical use!"

A. H. Silcox, managing editor, *The Gas World*:

"It was very kind of you to send me a copy of the bibliography. This is a valuable piece of work and reflects great credit on all concerned in its preparation. . . . "It is most gratifying to know how highly you value *The Gas World*. We too find your own publication of particular interest, especially at the present time when I feel it is essential that the gas industries of our two countries should keep in close contact with each other."

The American Gas Association will continue to keep its members informed as much as possible in regard to the protection of public utilities in war-torn countries and will be grateful for any worthwhile information in this connection.

New Requirements Go to the Industry

FOUR sets of approval requirements were recently prepared and distributed to utility companies and interested manufacturers for comment and criticism. These include revisions to existing requirements for central heating appliances, gas ranges and space heaters, and proposed requirements for gas-fired duct furnaces.

Several important changes appear in the central heating standards. Required thickness for heat exchangers of warm air furnaces is increased from No. 22 to No. 20 U. S. Standard gage. A new requirement specifies a minimum heating element temperature of 178° within a given time to insure against occurrence of condensation and resulting corrosion. In addition maximum external surface temperature of heating elements is limited to 875° F., which is well below the scaling temperature of sheet steel. Another new requirement allows a maximum differential of 0.4% CO_2 in the flue gases from both boilers and furnaces with control compartment doors in place and removed.

Revised range standards include detailed requirements for automatic electric pilot igniters. Accessories and fittings must be accessible from the front of the range to facilitate servicing. Combustion tests are strengthened by reducing the time before oven samples are taken after a cold start from 15 minutes to 5 minutes. A major change in the former oven heat distribution test calls for baking of four layer cakes simultaneously, using a standard recipe. All cakes must be evenly browned, within definite limits as determined by a photoelectric reflectometer, thus eliminating the human element in evaluating their color.

Three new sections are added to the space heater requirements besides many minor changes. Noise of ignition, operation and extinction are held to definite limits determined by a sound-level meter. Valve handle temperatures must not exceed a rise of 40° F. above room temperature. Refractory radiants must be capable of withstanding heating and cooling shocks.

In order that all suggestions and criticisms from the industry may be available for consideration by the appropriate subcommittee without delay, it is requested that they be submitted in advance of November 1. Letters should be addressed to C. H. Waring, Chairman, A.S.A. Sectional Committee, Project Z21, A. G. A. Approval Requirements Committee, 1032 East 62nd Street, Cleveland, Ohio.

A. G. A. Laboratories Hold Annual Picnic

PINE RIDGE COUNTRY CLUB located near Cleveland was again chosen for the Laboratories' annual picnic, which was held August 29. One hundred and sixty-five people attended, including families of the staff, who took full advantage of the opportunity to become better acquainted. Invitations had been issued to all former employees, a number of whom were present with their wives, including several now in the army and serving in nearby posts.

Golf and tennis occupied the morning hours. Immediately after a picnic lunch, a ball game between the Research and Testing Departments took place, the latter winning by a score of 24 to 7. Swimming races and miscellaneous games finished the afternoon.

In the evening a lawn party was held, followed by a buffet dinner. After-dinner speeches were brief and to the point. R. M. Conner, director of the Laboratories, gave a short talk in which he called attention to the number of former employees now in military service. C. H. Waring, chairman of the Approval Requirements Committee and member of the Laboratories Managing Committee, expressed his pleasure in attending his first Laboratories' picnic. The last to speak was Eugene D. Milener of Headquarters staff, who expressed Major Forward's regrets in being unable to attend. The rest of the evening was devoted to dancing, music being furnished by Anthony Vitale's popular and well-known orchestra.

F. O. Suffron Leaves A.G.A. Laboratories

F. O. Suffron

THE many friends of F. O. Suffron will be surprised to learn that he has resigned from the staff of the American Gas Association Testing Laboratories and has left Cleveland to join his family on the West Coast. Continued ill health of members of his family had forced them to take up residence in California some time ago, and this was a major factor in his decision to return to that state.

For the past 11 years, Mr. Suffron has been associated with the Testing Laboratories, holding various executive positions. As his first assignment, he took an active part in the Laboratories extensive pipe joint research project, and in requirements committee work. He held the position of research engineer for some time, in which capacity he was in charge of all research activities at the Laboratories. Later he was supervisor of the Pacific Coast Branch for three years.

Mr. Suffron is a graduate of Oregon State College, obtaining his Bachelor of Science degree in Civil Engineering in 1915. Prior to joining the Laboratories he was associated with Smith Emery Company of San Francisco, the Portland Gas and Coke Company, and the Washington Gas and Electric Company. He holds Professional Engineers' Certificates in Civil and Mechanical Engineering, and has been active in committee work of the American Society for Testing Materials.

The many friendships formed in his early days while working with western gas companies and the additional ones made while supervisor of the Pacific Coast Branch no doubt influenced his decision to take up residence again in California.

Fire Prevention Week Campaign Material

THE National Fire Protection Association has prepared a number of items of fire prevention literature, posters, etc., for use in connection with the 1941 Fire Prevention Week campaign, October 5-11. This material is intended for quantity distribution and for the use of committees and others interested in campaigns to reduce the fire waste.

Among the material offered at nominal prices are: two striking posters; a flyer; an 8-page folder, "Fire Prevention Quiz"; a 16-page booklet for school use, "Fire Prevention Picture Book"; a 50-page illustrated "Fire Prevention Week Handbook"; a 16-page supplement, "Facts About Fire"; a 16-page pamphlet of "Fire Prevention Exhibits"; and a two-color folder for home use, "Keep Your Home from Burning." These items may be secured from the National Fire Protection Association, 60 Batterymarch St., Boston, Mass.

B. Kay Johnson Dies

B. KAY JOHNSON, widely known sales representative of gas appliance manufacturing concerns for many years, died July 5 of a heart ailment at Mountain Lake, N. J. He was 51 years of age.

A native of Mt. Holly, N. J., Mr. Johnson had lived in East Orange, N. J., for the past 20 years. He was associated with the Welsbach Company for many years and later joined the sales organization of the Cleveland Heater Company. He resigned from the latter company Jan. 1, 1937, to become affiliated with the Whitehead Metal Products Co., Inc., of New York where he was employed at the time of his death.

Mr. Johnson was a member of the American Gas Association.

Natural Gas Research Fellows Named

THE fund made available to the Natural Gas Section in 1927 by the Natural Gas Supply Men and first put to use in 1930 in the form of two graduate fellowships in natural gas engineering, is once more responsible for giving two young men the opportunity to continue their graduate studies in natural gas research.

This year D. J. Kerley of Bennett, N. M., is the fellowship holder at The Pennsylvania State College and J. M. Hillsman of Shreveport, La., received a fellowship at the University of Oklahoma.

Mr. Kerley was born in Pueblo, Colo., and was graduated in 1940 with a B.A. degree in Chemistry-Physics from the Texas College of Mines in El Paso, Texas. He has been employed for seven years by the El Paso Natural Gas Company in the departments of main line maintenance, measurement and dispatching.

Mr. Hillsman, born in Austin, Texas, was graduated from the Texas College of Arts and Industries in 1939 and has been employed by the United Gas System, the West Texas Gas Company and the Oil & Gas Division of the Texas Railroad Commission. He was graduated from college with the highest honors of his class in Natural Gas Engineering and also holds a B.S. degree in Physics. While at Texas College of Arts and Industries he assisted as an instructor in the chemistry and physics laboratories.

The Natural Gas Section of the American Gas Association is proud to honor these young men with its two fellowships and looks forward to the contribution each of them will be able to make towards the furtherance of those interests which direct the natural gas industry.

A. G. A. Memorial to H. L. Dickerson

EXPRESSING profound sorrow at the passing of Harry L. Dickerson, on August 16 in New York City, the Executive Board of the American Gas Association of which Mr. Dickerson was a member, at a meeting Sept. 17, unanimously passed a memorial honoring his memory. After citing his outstanding business career, the memorial read in part:

"During all of his association with the gas industry, he was keenly interested in the affairs of American Gas Association, and devoted considerable time to a number of important committees of the Association. It is significant that one of the last meetings he attended was an informal meeting on July 23 of the Natural Gas Section, at which time a tentative program for the Natural Gas Section at the Atlantic City meeting this fall was planned.

"His passing is not only a personal loss to all of his friends and associates who esteemed him so highly, but is a distinct loss to the gas industry in general and to this Association in particular."

A. G. A. Convention Program

(Continued from page 335)

Report of Distribution Committee—L. W. Tuttle, Chairman, Public Service Co. of Northern Illinois, Oak Park, Ill.

Report of Gas Production Committee—L. E. Knowlton, Chairman, Providence Gas Company, Providence, R. I.

Report of Gas Conditioning Committee—R. E. Kruger, Chairman, Rochester Gas & Electric Corp., Rochester, N. Y.

Report of Committee on Operation of Public Utility Motor Vehicles—R. H. Clark, Chairman, Consolidated Edison Co. of New York, Inc., New York, N. Y.

NATIONAL DEFENSE.

Tuesday Afternoon, October 21, 2:00 P.M.

Interesting Developments Concerning the Saving of Gas Oil by Mixing High B.t.u. Coke Oven Gas and Blue Gas—R. E. Kruger, Rochester Gas & Electric Corp., Rochester, N. Y.

Service Trends and Problems—H. G. Horstman, Public Service Co. of Indiana, Indianapolis, Indiana, and W. H. Weber, The Brooklyn Union Gas Company, Brooklyn, N. Y.

Motor Vehicles Place in the Gas Industry—R. H. Clark, Consolidated Edison Company of New York, Inc., New York, N. Y.

Recovery of "Pyridine Bases" from Coke Oven Gas and Methods for Determining Them—H. J. Meredith, Koppers Company, Seaboard Division, Kearny, N. J.

Personnel Service

SERVICES OFFERED

Young man—married—16 years' experience in gas equipment field with one employer—desires connection with manufacturer. Thoroughly versed in office routine, supervisory nature—**service** and **maintenance work**—warehouse stock control materials expediting. Due to present raw material situation is compelled to make other connections, preferably New York City. (39). **1428.**

Coal preparation **engineer** and **chemist,** immediately available. Long, varied experience in consulting and analytical work for large corporations. Exceptional ability in research, development, etc. Experienced in technical writing. Excellent references. Well known in bituminous coal industry and engineering societies. Salary, commensurate with position and location. Married. (43). **1429.**

Available immediately—college graduate with 11 years' experience in all phases on the manufactured gas industry—seven years in plant **production, distribution** and **management** with last four years spent with leading water heater manufacturer. (33). **1430.**

Financial, Treasury or **Administrative** position desired where over twenty years of broad experience can be utilized. Successful record in complex management and financial problems of utility operating, holding and service companies. Active supervision of financial, treasury, accounting, insurance, purchasing, personnel, corporate and operating procedure. Adaptable; married (40). **1431.**

POSITIONS OPEN

Technical and Scientific Aids for Federal Government

The U. S. Civil Service Commission is seeking technical and scientific aids for various Government agencies to do research and testing in radio, explosives, chemistry, physics, metallurgy, and fuels. The jobs pay from $1,440 to $2,000 a year.

No written test will be given to applicants. They will be rated on their education and experience as shown in their applications, subject to corroboration.

Full information, and application forms may be obtained from the Civil Service Commission's representative at any first- or second-class post office, from the U. S. Civil Service Commission in Washington, D. C., or from any one of the Commission's district offices.

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